

# **TOSHIBA**

AIR-CONDITIONER SPLIT HEAT PUMP OUTDOOR UNIT

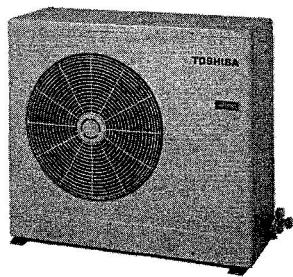
**RAV-161AH-P**

**RAV-261AH-P**

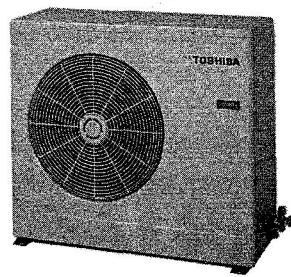
**RAV-261AH8-P**

**RAV-361AH8-P**

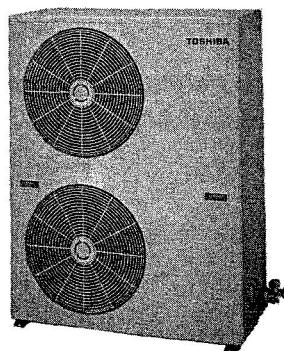
**RAV-461AH8-P**



**RAV-161AH-P**



**RAV-261AH-P**  
**RAV-261AH8-P**



**RAV-361AH8-P**  
**RAV-461AH8-P**

Specifications are subject to change without notice.

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### **NOTE: COMBINATION OF INDOOR UNITS AND OUTDOOR UNITS**

#### **Basic Criteria for Combinations**

For details of indoor units to be connected, refer to the each Service Data for individual RAV-series split system air conditioner.

**Table Available indoor unit model name and service data file number**

Type \ Capacity Rank	160	260	360	460
Wall	RAV-160KH-P No. 300-885	RAV-260KH-P No. 300-885	—	—
Cassette	RAV-160UH-P No. 300-883	RAV-260UH-P No. 300-883	RAV-360UH-P No. 300-881	RAV-460UH-P No. 300-881
Duct	RAV-161BH No. 300-958	RAV-260BH-P No. 300-920	RAV-360BH-P No. 300-920	RAV-460BH-P No. 300-920

# 1. SPECIFICATIONS

ITEM	MODEL	RAV-160KH-P
Cooling capacity	kcal/h	4,000
	BTU/h	16,000
	kW	4.7
Heating capacity	kcal/h	4,300
	BTU/h	17,200
	kW	5.0
Power source	Phase	1
	V	220 - 240
	Hz	50
Power consumption	COOLING	HEATING
	kW	2.3
		2.2
Power factor	%	90
Running current	A	11.1
Starting current	A	60
Operating noise (SPL)	Indoor unit dB(A)	45/40/38
	Outdoor unit dB(A)	50
Refrigerant	Name of refrigerant	R-22
	Charge volume kg	1.6
	Add. volume (20-30m) g/m	35
Refrigerant control	Capillary tube & Expansion valve	
	Larger side size mm (in.)	φ12.7 (1/2")
	Coupler style	Flare
	Smaller side size mm (in.)	φ6.4 (1/4")
	Coupler style	Flare
	Standard length m (ft)	5.0 (16'4")
	Maximum length *3 (of one way) m (ft)	30 (98'4")
	Maximum height	
	Indoor unit higher m (ft)	15 (49')
	Outdoor unit higher m (ft)	30 (98'4")
Condensate drain pipe diameter	mm	φ20 (ID)
INDOOR UNIT Model		RAV-160KH-P
Appearance colour		Silky white
Dimensions	Height mm (ft-in.)	370 (1'2-9/16")
	Width mm (ft-in.)	1,020 (3'4-3/16")
	Depth mm (ft-in.)	200 (7-7/8")
Net weight	kg (lbs)	19 (42)
Heat exchanger type		Finned tube
Indoor fan type		Transverse flow fan
Air volume	m <sup>3</sup> /h (CFM)	780 (459)
Fan motor output	W	27
Air filter		Washable
OUTDOOR UNIT Model		RAV-161AH-P
Appearance colour		Bronze white (Munsell 6Y7.5/1)
Dimensions	Height mm (ft-in.)	740 (2'5-1/8")
	Width mm (ft-in.)	880 (2'10-5/8")
	Depth mm (ft-in.)	310 (1'3/16")
Net weight	kg (lbs)	61 (134)
Heat exchanger type		Finned tube
Outdoor fan type		Propeller fan
Fan motor output	W	39
Compressor	Model	PH250X3-4LS
	Output kW	2.0
Protective device		High pressure switch, Fuse, Crankcase heater, Overload relay, Bi-metal thermostat

Specifications are subject to change without notice.

Note 1: Cooling capacity is based on the following temperature conditions.

Indoor air inlet temperature: 27°C DB (80°F DB)  
19.5°C WB (67°F WB)

Outdoor air inlet temperature: 35°C DB (95°F DB)

Note 2: Heating capacity is based on the following temperature conditions.

Indoor air inlet temperature: 21°C DB (70°F DB)  
7°C DB (45°F DB)

Outdoor air inlet temperature: 6°C WB (43°F WB)

Note 3: These mean actual length.

Note 4: Operating range of the units

Indoor air temperature

When cooling

Maximum 32°C DB, 22.5°C WB (90°F DB, 73°F WB)

Minimum 18°C DB, 15.5°C WB (65°F DB, 60°F WB)

When heating

Maximum 29°C DB (84°F DB)

Minimum 15°C DB (59°F DB)

Outdoor air temperature

When cooling

Maximum 43°C DB, 25.5°C WB (109°F DB, 78°F WB)

Minimum 0°C DB (-32°F DB)

When heating

Maximum 21°C DB, 15.5°C WB (70°F DB, 60°F WB)

Minimum -10°C WB (14°F WB)

ITEM	MODEL	RAV-260KH-P	RAV-260KH-P
Cooling capacity	kcal/h	6,300	
	BTU/h	25,200	
	kW	7.3	
Heating capacity	kcal/h	6,800	
	BTU/h	27,200	
	kW	7.9	
Power source	Phase	1	3
	V	220 - 240	380 - 415
	Hz	50	
Power consumption	COOLING	HEATING	COOLING
	kW	3.0	2.75
	%	88	87
	A	14.8	13.8
Starting current	A	80	25
Operating noise (SPL)	Indoor unit dB(A)	46/42/38	
	Outdoor unit dB(A)	53	
Refrigerant	Name of refrigerant	R-22	
	Charge volume kg	2.35	
	Add. volume (20-30m) g/m	60	
Refrigerant control	Capillary tube & Expansion valve		
	Larger side size mm (in.)	ø15.9 (5/8")	
	Coupler style	Flare	
	Smaller side size mm (in.)	ø9.5 (3/8")	
	Coupler style	Flare	
	Standard length m (ft)	5.0 (16'4")	
	Maximum length *3 (of one way) m (ft)	30 (98'4")	
	Maximum height Indoor unit higher m (ft)	15 (49")	
	Outdoor unit higher m (ft)	30 (98'4")	
Condensate drain pipe diameter	mm	ø20 (ID)	
INDOOR UNIT Model		RAV-260KH-P	RAV-260KH-P
Appearance colour		Silky white	
Dimensions	Height mm (ft-in.)	370 (1' 2-9/16")	
	Width mm (ft-in.)	1,350 (4' 5-3/16")	
	Depth mm (ft-in.)	200 (7-7/8")	
Net weight	kg (lbs)	25 (55)	
Heat exchanger type		Finned tube	
Indoor fan type		Transverse flow fan	
Air volume	m³/h (CFM)	1,200 (706)	
Fan motor output	W	27	
Air filter		Washable	
OUTDOOR UNIT Model		RAV-261AH-P	RAV-261AH8-P
Appearance colour		Bronze white (Munsell 6Y7.5/1)	
Dimensions	Height mm (ft-in.)	790 (2' 7-7/64")	
	Width mm (ft-in.)	880 (2' 10-5/8")	
	Depth mm (ft-in.)	310 (1' 3/16")	
Net weight	kg (lbs)	80 (176)	
Heat exchanger type		Finned tube	
Outdoor fan type		Propeller fan	
Fan motor output	W	63	
Compressor	Model	PH330X3-4MS	YH330X3-4MS
	Output kW	2.2	
Protective device		Inner overload relay, Fuse, High pressure switch, High pressure switch, Crankcase heater, Bimetal thermostat	

Specifications are subject to change without notice.

Note 1: Cooling capacity is based on the following temperature conditions.

Indoor air inlet temperature: 27°C DB (80°F DB)  
19.5°C WB (67°F WB)

Outdoor air inlet temperature: 35°C DB (95°F DB)

Note 2: Heating capacity is based on the following temperature conditions.

Indoor air inlet temperature: 21°C DB (70°F DB)  
7°C DB (45°F DB)  
6°C WB (43°F WB)

Note 3: These mean actual length.

Note 4: Operating range of the units

Indoor air temperature

When cooling

Maximum 32°C DB, 22.5°C WB (90°F DB, 73°F WB)  
Minimum 18°C DB, 15.5°C WB (65°F DB, 60°F WB)

When heating

Maximum 29°C DB (84°F DB)  
Minimum 15°C DB (59°F DB)

Outdoor air temperature

When cooling

Maximum 43°C DB, 25.5°C WB (109°F DB, 78°F WB)  
Minimum 0°C DB (32°F DB)

When heating

Maximum 21°C DB, 15.5°C WB (70°F DB, 60°F WB)  
Minimum -10°C WB (14°F WB)

ITEM	MODEL	RAV-160UH-P
Cooling capacity	kcal/h	4,000
	BTU/h	16,000
	kW	4.7
Heating capacity	kcal/h	4,300
	BTU/h	17,200
	kW	5.0
Power source	Phase	1
	V	220-240
	Hz	50
Power consumption Power factor Running current Starting current Operating noise (SPL)	COOLING	HEATING
	kW	2.3
	%	90
	A	11.1
	A	60
	Indoor unit	44/40/37
	Outdoor unit	50
	Name of refrigerant	R-22
	Charge volume	1.6
Refrigerant control Interconnection pipe	Add. volume (20-30m)	35
	Larger side size	Capillary tube & Expansion valve
	mm (in.)	ø12.7 (1/2")
	Coupler style	Flare
	Smaller side size	ø6.4 (1/4")
	Coupler style	Flare
	Standard length	5.0 (16'4")
	Maximum length (of one way)	30 (98'4")
	Maximum height	
INDOOR UNIT Model	Indoor unit higher	15 (49')
	Outdoor unit higher	30 (98'4")
	Condensate drain pipe diameter	ø32 (OD)
Dimensions	Height	RAV-160UH-P
	Width	Black (Zinc galvanized steel
	Depth	+ Thermal insulator)
	Height	300 (11-13/16")
	Width	840 (2'9-1/16")
	Depth	740 (2'5-1/8")
	Net weight	29 (64)
	Heat exchanger type	Finned tube
	Indoor fan type	Radial fan
CEILING PANEL Model	Air volume	980 (577)
	Fan motor output	30
	Appearance colour	RBC-U260PG(W)-P
	Height	Silky mist (Munsell 1Y8.9/0.5)
	Width	28 (1-1/8")
	Depth	1,000 (3'3-3/8")
	Net weight	840 (2'9-1/16")
	Air filter	8.5 (18.7)
	OUTDOOR UNIT Model	Washable
Dimensions	Height	RAV-161AH-P
	Width	Bronze white (Munsell 6Y7.5/1)
	Depth	740 (2'5-1/8")
	Height	880 (2'10-5/8")
	Width	310 (1'3/16")
	Depth	61 (134)
	Net weight	
	Heat exchanger type	Finned tube
	Outdoor fan type	Propeller fan
Compressor	Fan motor output	39
	Model	PH250X3-4LS
	Output	2.0
Safety device		High pressure switch, Fuse, Crankcase heater, Overload relay,
		Float switch, Bimetal thermostat

Specifications are subject to change without notice.

Note 1: Cooling capacity is based on the following temperature conditions.

Indoor air inlet temperature: 27°C DB (80°F DB)  
19.5°C WB (67°F WB)

Outdoor air inlet temperature: 35°C DB (95°F DB)

Note 2: Heating capacity is based on the following temperature conditions.

Indoor air inlet temperature: 21°C DB (70°F DB)  
Outdoor air inlet temperature: 7°C DB (45°F DB)

6°C WB (43°F WB)

Note 3: These mean actual length.

Note 4: Operating range of the units

Indoor air temperature

When cooling

Maximum 32°C DB, 22.5°C WB (90°F DB, 73°F WB)

Minimum 18°C DB, 15.5°C WB (65°F DB, 60°F WB)

When heating

Maximum 29°C DB

(84°F DB)

Minimum 15°C DB

(59°F DB)

Outdoor air temperature

When cooling

Maximum 43°C DB, 25.5°C WB (109°F DB, 78°F WB)

Minimum 0°C DB

(32°F DB)

When cooling

Maximum 21°C DB, 15.5°C WB (70°F DB, 60°F WB)

Minimum -10°C WB

(14°F WB)

ITEM	MODEL	RAV-260UH-P	RAV-260UH-P
Cooling capacity	kcal/h	6,300	
	BTU/h	25,200	
	kW	7.3	
Heating capacity	kcal/h	6,800	
	BTU/h	27,200	
	kW	7.9	
Power source	Phase	1	3
	V	220 - 240	380 - 415
	Hz	50	
		COOLING	HEATING
Power consumption	kW	3.0	2.75
Power factor	%	88	87
Running current	A	14.8	13.8
Starting current	A	80	25
Operating noise (SPL)	Indoor unit dB(A)	45/41/37	
	Outdoor unit dB(A)	53	
Refrigerant	Name of refrigerant	R-22	
	Charge volume kg	2.35	
	Add. volume (20-30m) g/m	60	
Refrigerant control		Capillary tube & Expansion valve	
Interconnection pipe	Larger side size mm (in.)	ø15.9 (5/8")	
	Coupler style	Flare	
	Smaller side size mm (in.)	ø9.5 (3/8")	
	Coupler style	Flare	
	Standard length m (ft)	5.0 (16'4")	
	Maximum length (of one way) m (ft)	30 (98'4")	
	Maximum height		
	Indoor unit higher m (ft)	15 (49')	
	Outdoor unit higher m (ft)	30 (98'4")	
Condensate drain pipe diameter mm		ø32 (OD)	
INDOOR UNIT Model		RAV-260UH-P	
Appearance colour		Black (Zinc galvanized steel + Thermal insulator)	
Dimensions	Height mm (ft-in.)	300 (11-13/16")	
	Width mm (ft-in.)	840 (2'9-1/16")	
	Depth mm (ft-in.)	740 (2'5-1/8")	
Net weight kg (lbs)		29 (64)	
Heat exchanger type		Finned tube	
Indoor fan type		Radial fan	
Air volume m³/h (CFM)		1,260 (742)	
Fan motor output W		45	
CEILING PANEL Model		RBC-U260PG(W)-P	
Appearance colour		Silky mist (Munsell 1Y8.9/0.5)	
Dimensions	Height mm (ft-in.)	28 (1-1/8")	
	Width mm (ft-in.)	1,000 (3'3-3/8")	
	Depth mm (ft-in.)	840 (2'9-1/16")	
Net weight kg (lbs)		8.5 (18.7)	
Air filter		Washable	
OUTDOOR UNIT Model		RAV-261AH-P	RAV-261AH8-P
Appearance colour		Bronze white (Munsell 6Y7.5/1)	
Dimensions	Height mm (ft-in.)	790 (2'7-3/8")	
	Width mm (ft-in.)	880 (2'10-5/8")	
	Depth mm (ft-in.)	310 (1'3/16")	
Net weight kg (lbs)		80 (176)	
Heat exchanger type		Finned tube	
Outdoor fan type		Propeller fan	
Fan motor output W		63	
Compressor	Model	PH330X3-4MS	YH330X3-MS
	Output kW	2.2	
Safety device		High pressure switch, Fuse, Crankcase heater, Inner overload relay, Float switch, Bimetal thermostat	

Specifications are subject to change without notice.

Note 1: Cooling capacity is based on the following temperature conditions.

Indoor air inlet temperature: 27°C DB (80°F DB)  
19.5°C WB (67°F WB)

Outdoor air inlet temperature: 35°C DB (95°F DB)

Note 2: Heating capacity is based on the following temperature conditions.

Indoor air inlet temperature: 21°C DB (70°F DB)  
7°C DB (45°F DB)

Outdoor air inlet temperature: 6°C WB (43°F WB)

Note 3: These mean actual length.

Note 4: Operating range of the units

Indoor air temperature

When cooling Maximum 32°C DB, 22.5°C WB (90°F DB, 73°F WB)  
Minimum 18°C DB, 15.5°C WB (65°F DB, 60°F WB)

When heating

Maximum 29°C DB (84°F DB)  
Minimum 15°C DB (59°F DB)

Outdoor air temperature

When cooling Maximum 43°C DB, 25.5°C WB (109°F DB, 78°F WB)  
Minimum 0°C DB (-32°F DB)

When heating

Maximum 21°C DB, 15.5°C WB (70°F DB, 60°F WB)  
Minimum -10°C WB (14°F WB)

ITEM	MODEL	RAV-360UH-P	RAV-460UH-P
Cooling capacity	kcal/h	9,000	11,200
	BTU/h	36,000	44,800
	kW	10.5	13.0
Heating capacity	kcal/h	9,300	11,900
	BTU/h	37,200	47,600
	kW	10.8	13.8
Power source	Phase	3	3
	V	380-415	380-415
	Hz	50	50
		COOLING	HEATING
Power consumption	kW	4.2	3.6
Power factor	%	89	86
Running current	A	6.8	6.0
Starting current	A	42	50
Operating noise (SPL)	Indoor unit Outdoor unit	dB(A) dB(A)	50/45/42 55
Refrigerant	Name of refrigerant	R-22	R-22
	Charge volume	kg	3.4
	Add. volume (20-50m)	g/m	50
Refrigerant control		Capillary tube & Expansion valve	Capillary tube & Expansion valve
Interconnection pipe	Larger side size	mm (in.)	φ19 (3/4")
	Coupler style		Flare
	Smaller side size	mm (in.)	φ9.5 (3/8")
	Coupler style		Flare
	Standard length	m (ft)	5.0 (16'4")
	Maximum length (of one way)	m (ft)	50 (164')
	Maximum height		
	Indoor unit higher	m (ft)	20 (65'6")
	Outdoor unit higher	m (ft)	50 (164')
Condensate drain pipe diameter	mm	φ32 (OD)	φ32 (OD)
INDOOR UNIT Model		RAV-360UH-P	RAV-460UH-P
Appearance colour		Black (Zinc galvanized steel + Thermal insulator)	Black (Zinc galvanized steel + Thermal insulator)
Dimensions	Height	mm (ft-in.)	350 (1'1-25/32)
	Width	mm (ft-in.)	1,130 (3'8-31/64")
	Depth	mm (ft-in.)	740 (2'5-9/64")
Net weight	kg (lbs)	53 (116.8)	53 (116.8)
Heat exchanger type		Finned tube	Finned tube
Indoor fan type		Centrifugal fan	Centrifugal fan
Air volume	m <sup>3</sup> /h (CFM)	1,680 (989)	1,860 (1,095)
Fan motor output	W	80	90
CEILING PANEL Model		RBC-U460PG(W)-P	RBC-U460PG(W)-P
Appearance colour		Silky mist (Munsell 1Y8.9/0.5)	Silky mist (Munsell 1Y8.9/0.5)
Dimensions	Height	mm (ft-in.)	28 ('1-3/32")
	Width	mm (ft-in.)	1,290 (4'2-51/64")
	Depth	mm (ft-in.)	840 (2'9-1/16")
Net weight	kg (lbs)	10 (22)	10 (22)
Air filter		Washable	Washable
OUTDOOR UNIT Model		RAV-361AH8-P	RAV-461AH8-P
Appearance colour		Bronze white (Munsell 6Y7.5/1)	Bronze white (Munsell 6Y7.5/1)
Dimensions	Height	mm (ft-in.)	1,240 (4'13/16")
	Width	mm (ft-in.)	930 (3'5/8")
	Depth	mm (ft-in.)	385 (1'3-5/32")
Net weight	kg (lbs)	107 (236)	115 (254)
Heat exchanger type		Finned tube	Finned tube
Outdoor fan type		Propeller fan	Propeller fan
Air flow volume	m <sup>3</sup> /h (CFM)	6,000 (3,530)	6,000 (3,530)
Fan motor output	W	39 + 63	39 + 63
Compressor	Model	YH406JA	YH506JA
	Output	kW	3.0
Protective device		High pressure switch, Fuse, Overcurrent relay, Crankcase heater, Inner overload relay, Float switch	High pressure switch, Fuse, Overcurrent relay, Crankcase heater, Inner overload relay, Float switch

Specifications are subject to change without notice.

Note 1: Cooling capacity is based on the following temperature conditions.

Indoor air inlet temperature: 27°C DB (80°F DB)  
19.5°C WB (67°F WB)

Outdoor air inlet temperature: 35°C DB (95°F DB)

Note 2: Heating capacity is based on the following temperature conditions.

Indoor air inlet temperature: 21°C DB (70°F DB)  
7°C DB (45°F DB)

Outdoor air inlet temperature: 6°C WB (43°F WB)

Note 3: These mean actual length.

Note 4: Operating range of the units

Indoor air temperature

When cooling Maximum 32°C DB, 22.5°C WB (90°F DB, 73°F WB)  
Minimum 18°C DB, 15.5°C WB (65°F DB, 60°F WB)

When heating

Maximum 29°C DB (84°F DB)  
Minimum 15°C DB (59°F DB)

Outdoor air temperature

When cooling Maximum 43°C DB, 25.5°C WB (109°F DB, 78°F WB)  
Minimum 0°C DB (-32°F DB)

When heating

Maximum 21°C DB, 15.5°C WB (70°F DB, 60°F WB)  
Minimum -10°C WB (14°F WB)

ITEM	MODEL	RAV-161BH-P
Cooling capacity *1	kcal/h	4,000
	BTU/h	16,000
	kW	4.7
Heating capacity *2	kcal/h	4,300
	BTU/h	17,200
	kW	5.0
Power source	Phase	1
	V	220 - 240
	Hz	50
		COOLING HEATING
Power consumption	kW	2.3 2.2
Power factor	%	90 90
Running current	A	11.1 10.6
Starting current	A	60
Operating noise (SPL)	Indoor unit dB(A)	42/39/36
	Outdoor unit dB(A)	50
Refrigerant	Name of refrigerant	R-22
	Charge volume kg	1.6
	Add. volume (20-30m) g/m	35
Refrigerant control		Capillary tube & Expansion valve
	Larger side size mm (in.)	ø12.7 (1/2")
	Coupler style	Flare
	Smaller side size mm (in.)	ø6.4 (1/4")
	Coupler style	Flare
Interconnection pipe	Standard length m (ft)	5 (16'4")
	Maximum length *3 (of one way) m (ft)	30 (98'4")
	Maximum height	
	Indoor unit higher m (ft)	15 (49")
	Outdoor unit higher m (ft)	30 (98'4")
	Condensate drain pipe diameter mm	ø32 (OD)
INDOOR UNIT Model		RAV-161BH-P
Appearance colour		Black (Zinc galvanized steel + Thermal insulator)
Dimensions	Height mm (ft-in.)	320 (1'-19/32")
	Width mm (ft-in.)	700 (2'3-9/16")
	Depth mm (ft-in.)	800 (2'7-31/64")
Net weight	kg (lbs)	39 (86)
Heat exchanger type		Finned tube
Indoor fan type		Multi-blade fan
Air volume	m³/h (CFM)	840 (494)
Fan motor output	W	60
External static pressure	Standard mmAq	4
	Max. motor mmAq	10
CEILING PANEL Model		RBC-B161PE(W)
Appearance colour		Silky mist (Munsell Y8.9/0.5)
Dimensions	Height mm (ft-in.)	40 (1'-37/64")
	Width mm (ft-in.)	780 (2'6-45/64")
	Depth mm (ft-in.)	500 (1'7-11/16")
Net weight	kg (lbs)	4 (8.8)
Air filter		Washable
OUTDOOR UNIT Model		RAV-161AH-P
Appearance colour		Bronze white (Munsell 6Y7.5/1)
Dimensions	Height mm (ft-in.)	740 (2'5-1/8")
	Width mm (ft-in.)	880 (2'10-5/8")
	Depth mm (ft-in.)	310 (1'3/16")
Net weight	kg (lbs)	61 (134)
Heat exchanger type		Finned tube
Outdoor fan type		Propeller fan
Fan motor output	W	39
Compressor	Model	PH250X3-4LS
	Output kW	2.0
Safety device		High pressure switch, Fuse, Bimetal thermostat, Crankcase heater, Overload relay
Flexible duct		RBC-FD202E
Blowout unit		RBC-BU1E(W)
Suction canvas		RBC-CA161BE
Long-life filter kit		RBC-LK161BE
Built-in duct filter kit		RBC-DK161BE-P

Specifications are subject to change without notice.

Note 1: Cooling capacity is based on the following temperature conditions.

Indoor air inlet temperature: 27°C DB (80°F DB)  
19.5°C WB (67°F WB)

Outdoor air inlet temperature: 35°C DB (95°F DB)

Note 2: Heating capacity is based on the following temperature conditions.

Indoor air inlet temperature: 21°C DB (70°F DB)  
7°C DB (45°F DB)  
6°C WB (43°F WB)

Note 3: These mean actual length.

Note 4: Operating range of the units

Indoor air temperature

When cooling Maximum 32°C DB, 22.5°C WB (90°F DB, 73°F WB)  
Minimum 18°C DB, 15.5°C WB (65°F DB, 60°F WB)

When heating

Maximum 29°C DB (84°F DB)  
Minimum 15°C DB (59°F DB)

Outdoor air temperature

When cooling Maximum 43°C DB, 25.5°C WB (109°F DB, 78°F WB)  
Minimum 0°C DB (32°F DB)

When heating

Maximum 21°C DB, 15.5°C WB (70°F DB, 60°F WB)  
Minimum -10°C WB (14°F WB)

ITEM	MODEL	RAV-260BH-P	RAV-260BH-P
Cooling capacity	kcal/h *1	6,300	
	BTU/h	25,200	
	kW	7.3	
Heating capacity	kcal/h *2	6,800	
	BTU/h	27,200	
	kW	7.9	
Power source	Phase	1	3
	V	220 - 240	380 - 415
	Hz	50	
		COOLING	HEATING
Power consumption	kW	3.0	2.76
Power factor	%	88	87
Running current	A	14.8	13.8
Starting current	A	80	25
Operating noise (SPL)	Indoor unit dB(A) Outdoor unit dB(A)	43/40/37 53	
Refrigerant	Name of refrigerant	R-22	
	Charge volume kg	2.35	
	Add. volume (20-30m) g/m	60	
Refrigerant control		Capillary tube & Expansion valve	
	Larger side size mm (in.)	Φ15.9 (5/8")	
	Coupler style	Flare	
	Smaller side size mm (in.)	Φ9.5 (3/8")	
	Coupler style	Flare	
Interconnection pipe	Standard length m (ft)	5.0 (16'4")	
	Maximum length *3 (of one way) m (ft)	30 (98'4")	
	Maximum height		
	Indoor unit higher m (ft)	15 (49')	
	Outdoor unit higher m (ft)	30 (98'4")	
Condensate drain pipe diameter mm		Φ32 (OD)	
INDOOR UNIT Model		RAV-260BH-P	
Appearance colour		Black (Zinc galvanized steel + Thermal insulator)	
Dimensions	Height mm (ft-in.)	320 (1'-19/32")	
	Width mm (ft-in.)	1,000 (3'3-3/8")	
	Depth mm (ft-in.)	800 (2'7-31/64")	
Net weight kg (lbs)		53 (117)	
Heat exchanger type		Finned tube	
Indoor fan type		Multi-blade fan	
Air volume m <sup>3</sup> /h (CFM)		1,140 (671)	
Fan motor output W		100	
External static pressure Standard mmAq		4	
pressure Max. motor mmAq		10	
CEILING PANEL Model		RBC-B260PE(W)	
Appearance colour		Silky mist (Munsell 1Y8.9/0.5)	
Dimensions	Height mm (ft-in.)	40 (1'-37/64")	
	Width mm (ft-in.)	1,080 (3'6-17/32")	
	Depth mm (ft-in.)	500 (1'7-11/16")	
Net weight kg (lbs)		6 (13.2)	
Air filter		Washable	
OUTDOOR UNIT Model		RAV-261AH-P	RAV-261AH8-P
Appearance colour		Bronze white (Munsell 6Y7.5/1)	
Dimensions	Height mm (ft-in.)	790 (2'7-3/8")	
	Width mm (ft-in.)	880 (2'10-5/8")	
	Depth mm (ft-in.)	310 (1'3/16")	
Net weight kg (lbs)		80 (176)	
Heat exchanger type		Finned tube	
Outdoor fan type		Propeller fan	
Fan motor output W		63	
Compressor	Model	PH330X3-4MS	YH330X3-4MS
	Output kW	2.2	2.2
Safety device		High pressure switch, Fuse, Bimetal thermostat, Crankcase heater, Inner overload relay	High pressure switch, Fuse, Overcurrent relay, Crankcase heater, Inner overload relay, Return-Lock
Flexible duct		RBC-FD202E	
Blowout unit		RBC-BU1E(W)	
Suction canvas		RBC-CA260BE	
Long-life filter kit		RBC-LK260BE	
Built-in duct filter kit		RBC-DK261BE-P	

Specifications are subject to change without notice.

Note 1: Cooling capacity is based on the following temperature conditions.

Indoor air inlet temperature: 27°C DB (80°F DB)  
19.5°C WB (67°F WB)

Outdoor air inlet temperature: 35°C DB (95°F DB)

Note 2: Heating capacity is based on the following temperature conditions.

Indoor air inlet temperature: 21°C DB (70°F DB)  
7°C DB (45°F DB)

Outdoor air inlet temperature: 6°C WB (43°F WB)

Note 3: These mean actual length.

Note 4: Operating range of the units

Indoor air temperature

When cooling Maximum 32°C DB, 22.5°C WB (90°F DB, 73°F WB)

Minimum 18°C DB, 15.5°C WB (65°F DB, 60°F WB)

When heating

Maximum 29°C DB (84°F DB)

Minimum 15°C DB (59°F DB)

Outdoor air temperature

When cooling

Maximum 43°C DB, 25.5°C WB (109°F DB, 78°F WB)

Minimum 0°C DB (-32°F DB)

When heating

Maximum 21°C DB, 15.5°C WB (70°F DB, 60°F WB)

Minimum -10°C WB (14°F WB)

ITEM	MODEL	RAV-360BH-P	RAV-460BH-P
Cooling capacity	kcal/h BTU/h	9,000 36,000	11,200 44,800
	kW	10.5	13.0
Heating capacity	kcal/h BTU/h	9,300 37,200	11,900 47,600
	kW	10.8	13.8
Power source	Phase V Hz	3 380 - 415 50	3 380 - 415 50
	COOLING	HEATING	COOLING
Power consumption	kW	4.2	3.6
Power factor	%	89	87
Running current	A	6.8	6.0
Starting current	A	42	50
Operating noise (SPL)	Indoor unit Outdoor unit	dB(A) dB(A)	45/42/39 55
Refrigerant	Name of refrigerant	R-22	R-22
	Charge volume kg	3.4	3.9
	Add. volume (20-50m) g/m	50	50
Refrigerant control	Larger side size mm (in.) Coupler style Smaller side size mm (in.) Coupler style Standard length m (ft)	Capillary tube & Expansion valve Flare Φ9.5 (3/8") Flare 5.0 (16'4")	Capillary tube & Expansion valve Flare Φ9.5 (3/8") Flare 5.0 (16'4")
Interconnection pipe	Maximum length *3 m (ft) Maximum height Indoor unit higher m (ft) Outdoor unit higher m (ft)	50 (164') 20 (65'6") 50 (164')	50 (164') 20 (65'6") 50 (164')
	Condensate drain pipe diameter mm	Φ32 (OD)	Φ32 (OD)
INDOOR UNIT Model	RAV-360BH-P	RAV-460BH-P	
Appearance colour	Black (Zinc galvanized steel + Thermal insulator)	Black (Zinc galvanized steel + Thermal insulator)	
Dimensions	Height mm (ft-in.) Width mm (ft-in.) Depth mm (ft-in.)	320 (1'19 32/64") 1,350 (4'5 5/32") 800 (2'7 31/64")	320 (1'19 32/64") 1,350 (4'5 5/32") 800 (2'7 31/64")
	Net weight kg (lbs)	58 (128)	62 (137)
Heat exchanger type	Finned tube	Finned tube	
Indoor fan type	Multi-blade fan	Multi-blade fan	
Air volume	m³/h (CFM)	1,820	2,100
Fan motor output	W	120	140
External static pressure	Standard mmAq Max. motor mmAq	4 10	4 10
CEILING PANEL Model	RBC-B460PE(W)	RBC-B460PE(W)	
Appearance colour	Silky mist (Munsell 1Y8.9/0.5)	Silky mist (Munsell 1Y8.9/0.5)	
Dimensions	Height mm (ft-in.) Width mm (ft-in.) Depth mm (ft-in.)	40 (1'37 64/64") 1,430 (4'8 19/64") 500 (1'7 11/16")	40 (1'37 64/64") 1,430 (4'8 19/64") 500 (1'7 11/16")
	Net weight kg (lbs)	7 (15.4)	7 (15.4)
Air filter	Washable	Washable	
OUTDOOR UNIT Model	RAV-361AH8-P	RAV-461AH8-P	
Appearance colour	Bronze white (Munsell 6Y7.5/1)	Bronze white (Munsell 6Y7.5/1)	
Dimensions	Height mm (ft-in.) Width mm (ft-in.) Depth mm (ft-in.)	1,240 (4'13 16/64") 930 (3'5 8/64") 385 (1'3 5/32")	1,240 (4'13 16/64") 930 (3'5 8/64") 385 (1'3 5/32")
	Net weight kg (lbs)	107 (236)	115 (254)
Heat exchanger type	Finned tube	Finned tube	
Outdoor fan type	Propeller fan	Propeller fan	
Air flow volume	m³/h (CFM)	6,000 (3,530)	6,000 (3,530)
Fan motor output	W	39 + 63	39 + 63
Compressor	Model YH406JA	YH506JA	
	Output kW	3.0	3.75
Safety device	High pressure switch, Fuse, Overcurrent relay, Crankcase heater, Inner overload relay	High pressure switch, Fuse, Overcurrent relay, Crankcase heater, Inner overload relay	
Flexible duct	RBC-FD202E		
Blowout unit	RBC-BU1E(W)		
Suction canvas	RBC-CA460BE		
Long-life filter kit	RBC-LK460BE		
Built-in duct filter kit	RBC-DK461BE-P		

Specifications are subject to change without notice.

Note 4: Operating range of the units

Indoor air temperature

When cooling Maximum 32°C DB, 22.5°C WB (90°F DB, 73°F WB)  
Minimum 18°C DB, 15.5°C WB (65°F DB, 60°F WB)

When heating

Maximum 29°C DB (84°F DB)  
Minimum 15°C DB (59°F DB)

Outdoor air temperature

When cooling Maximum 43°C DB, 25.5°C WB (109°F DB, 78°F WB)  
Minimum 0°C DB (-32°F DB)

When heating

Maximum 21°C DB, 15.5°C WB (70°F DB, 60°F WB)  
Minimum -10°C WB (14°F WB)

Note 1: Cooling capacity is based on the following temperature conditions.

Indoor air inlet temperature: 27°C DB (80°F DB)  
19.5°C WB (67°F WB)

Outdoor air inlet temperature: 35°C DB (95°F DB)

Note 2: Heating capacity is based on the following temperature conditions.

Indoor air inlet temperature: 21°C DB (70°F DB)  
7°C DB (45°F DB)

Outdoor air inlet temperature: 6°C WB (43°F WB)

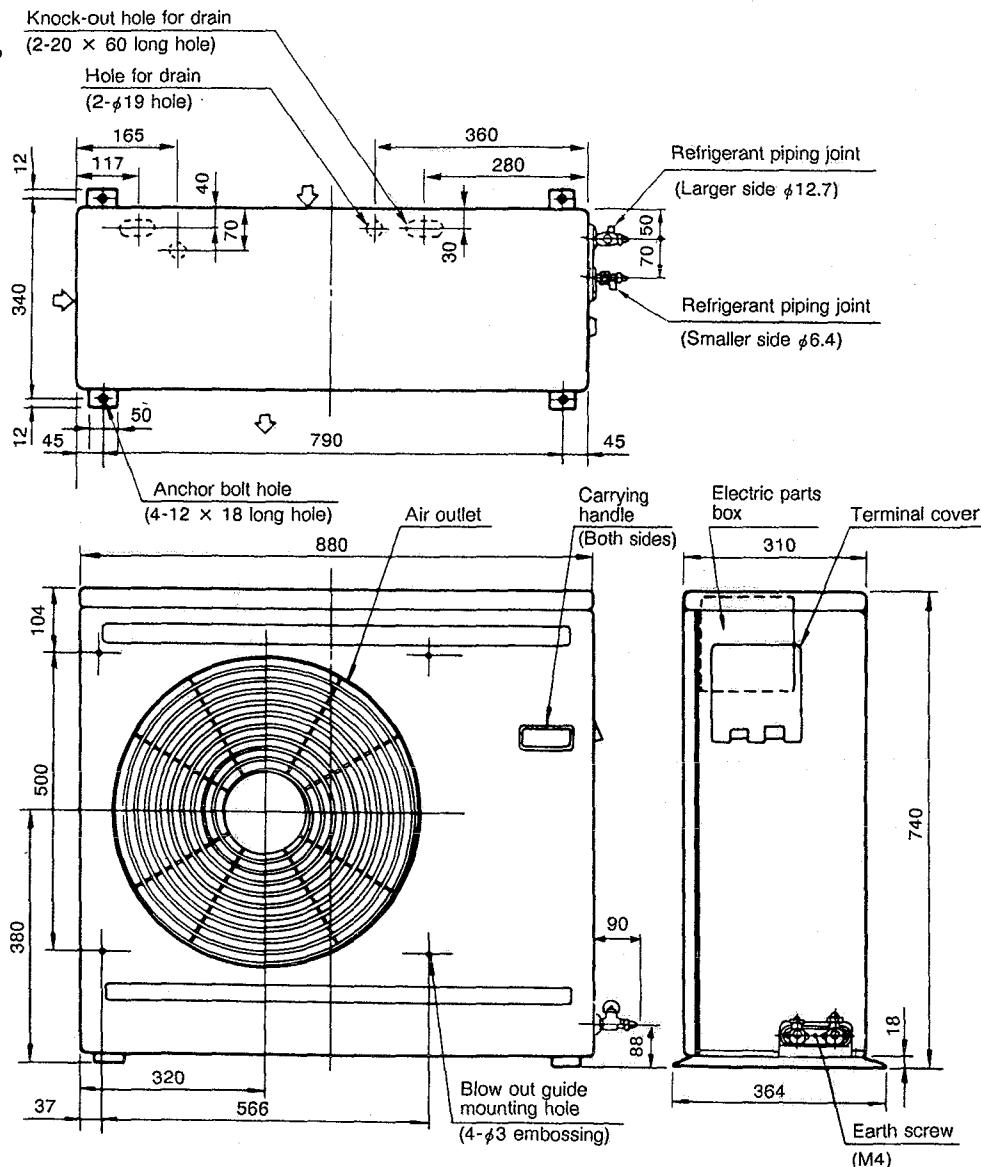
Note 3: These mean actual length.

## 2. CONSTRUCTION VIEWS

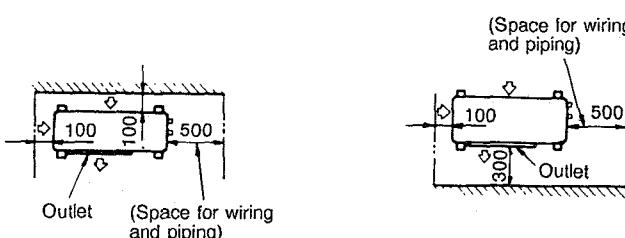
RAV-161AH-P

RAV-261AH-P

RAV-261AH8-P



### Space required for service



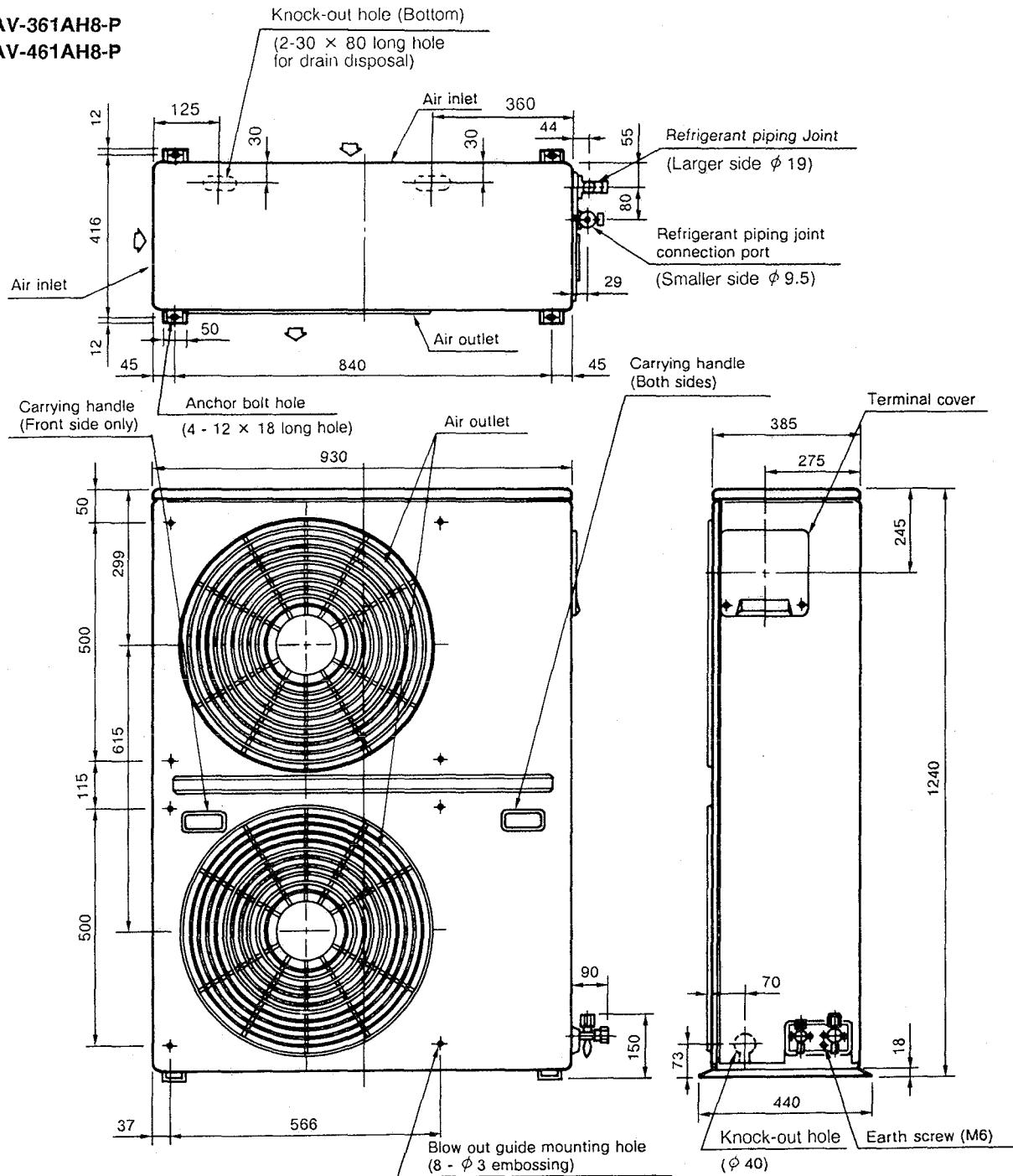
When installed with the  
inlet faced to the wall side

When installed with the  
outlet faced to the wall side

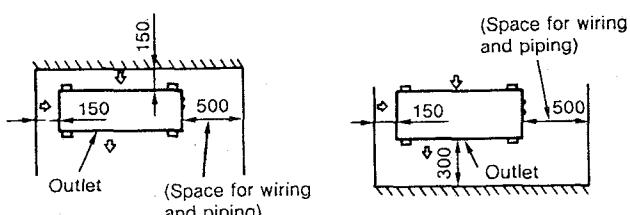
(Unit: mm)

Model	A	B	C	D
RAV-161AH-P	740	380	φ6.4	φ12.7
RAV-261AH-P RAV-261AH8-P	790	430	φ9.5	φ15.9

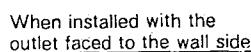
**RAV-361AH8-P**  
**RAV-461AH8-P**



Space required for service



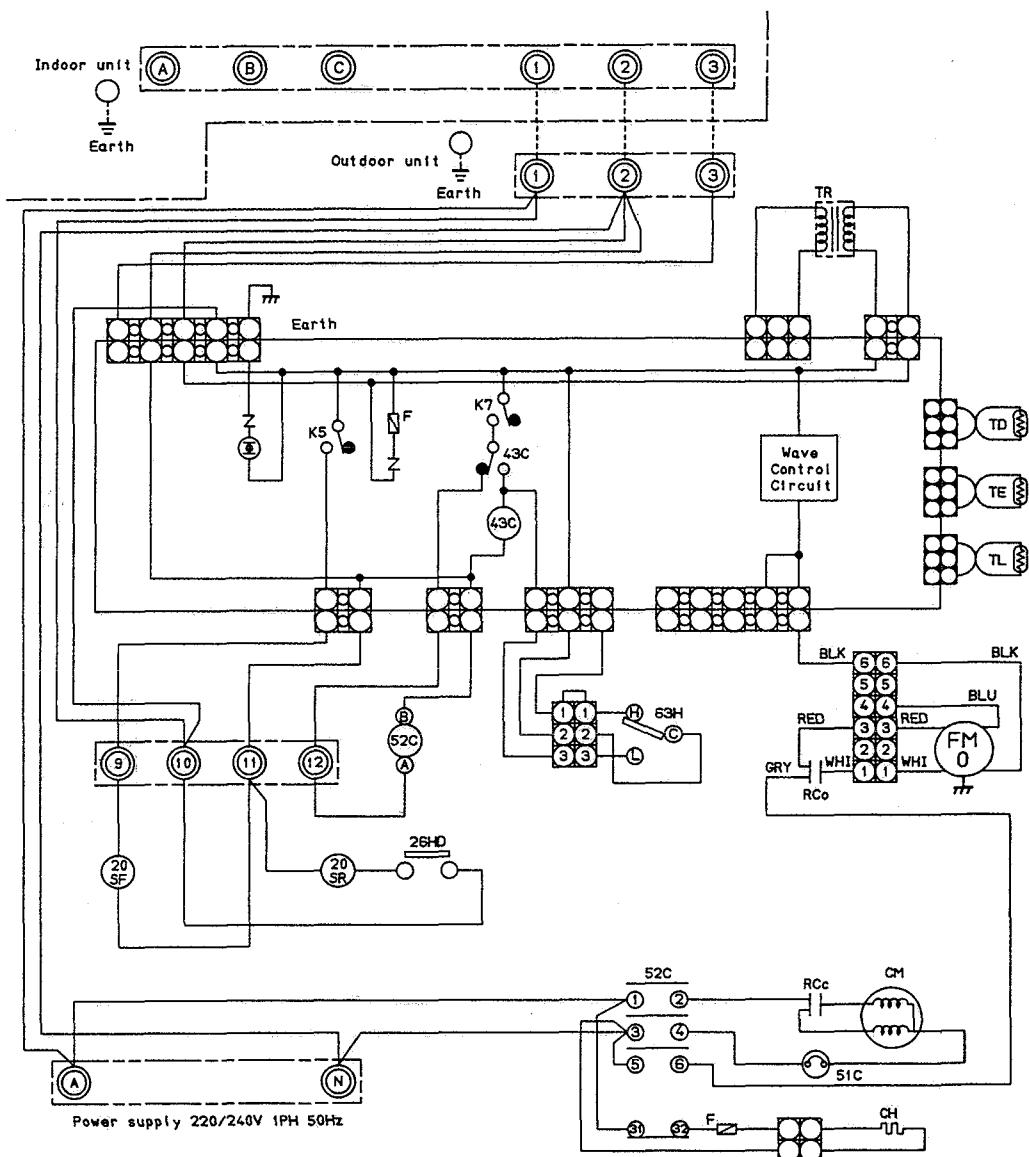
When installed with the inlet faced to the wall side



When installed with the outlet faced to the wall side

### 3. WIRING DIAGRAM

RAV-161AH-P

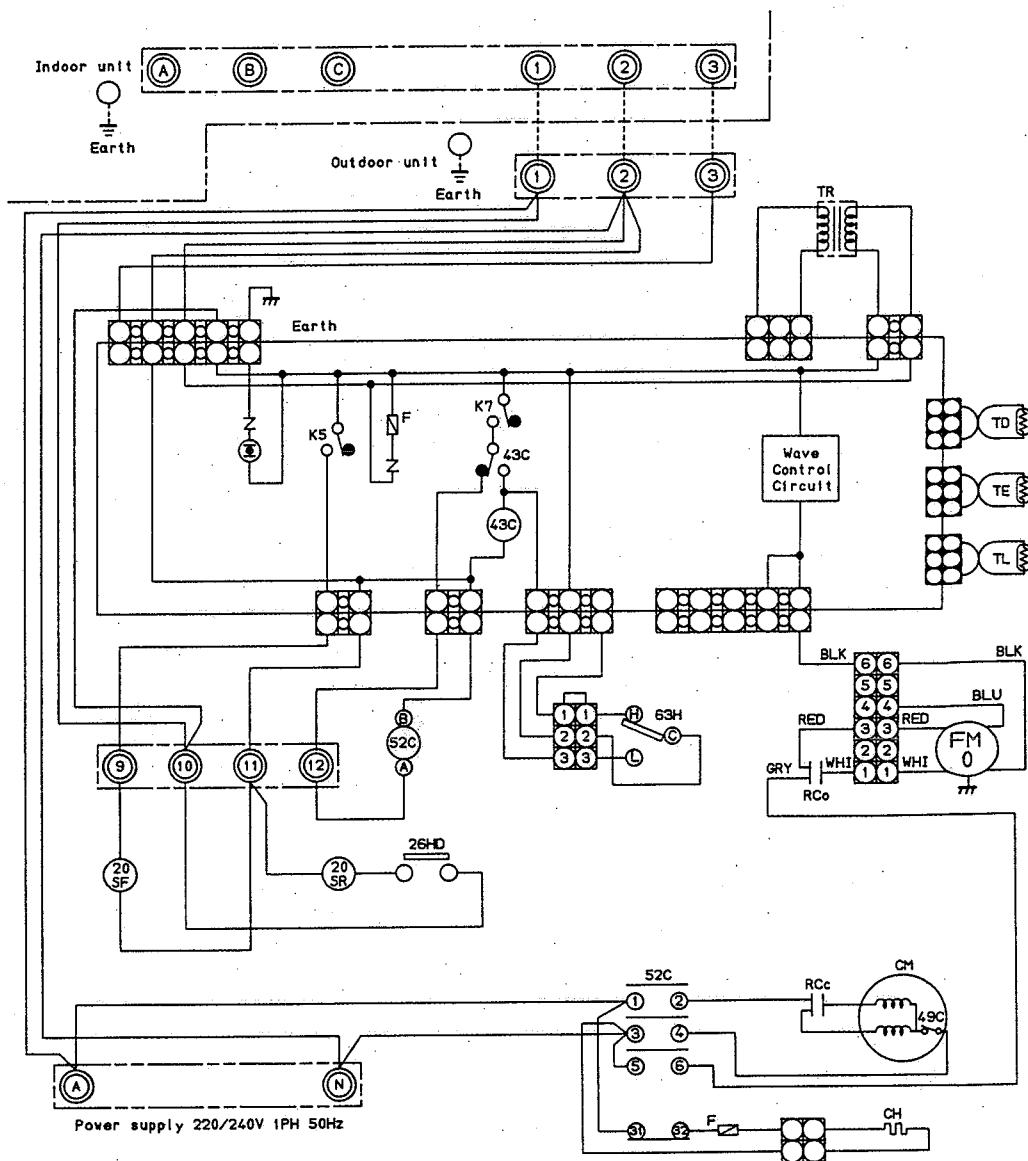


© shows terminal block and figures show terminal numbers.  
Broken lines show wiring at site.

Don't operate the units with the magnetic contactor pushed.

Symbol	Name	Symbol	Name	Symbol	Name
20SF	Solenoid Coil (4-Way Valve)	CM	Compressor	TD	Sensor
K <sub>5</sub> , K <sub>7</sub>	Relay	52C	Magnetic Contactor	63H	High Pressure Switch
51C	Overload Relay	FMo	Fan Motor (Outdoor)	CH	Crankcase Heater
20SR	Solenoid Coil (2-Way Valve)	TL	Sensor	F	Fuse
43C	Relay (PCB)	TE	Sensor	TR	Transformer
RCo	Running Capacitor	26HD	Bimetal Thermostat	RCc	Running Capacitor (Compressor)

RAV-261AH-P

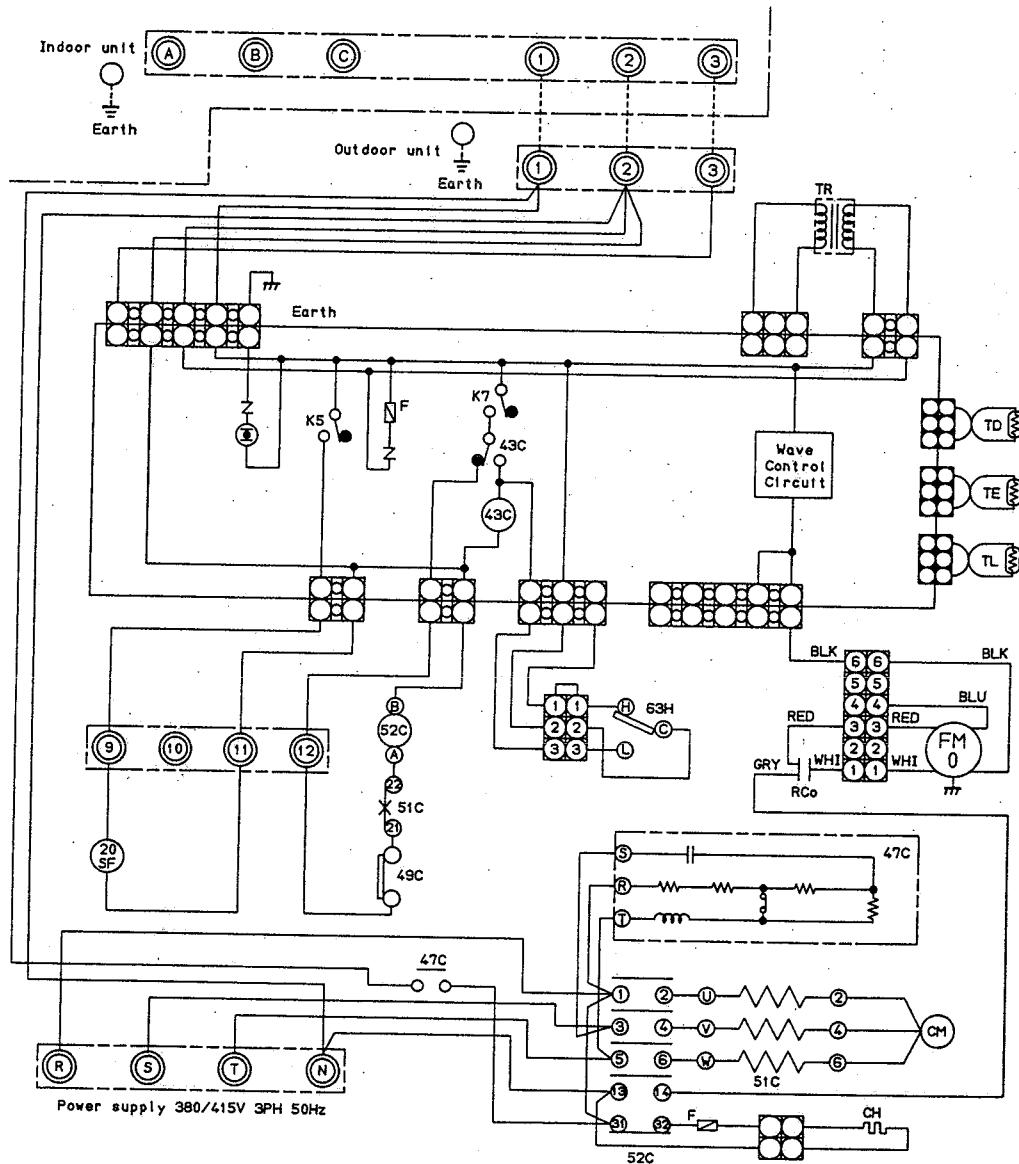


◎ shows terminal block and figures show terminal numbers.  
Broken lines show wiring at site.

**Don't operate the units with the magnetic contactor pushed.**

Symbol	Name	Symbol	Name	Symbol	Name
20SF	Solenoid Coil (4-Way Valve)	CM	Compressor	TD	Sensor
K <sub>5</sub> , K <sub>7</sub>	Relay	52C	Magnetic Contactor	63H	High Pressure Switch
49C	Inner Overload Relay	FMo	Fan Motor (Outdoor)	CH	Crankcase Heater
20SR	Solenoid Coil (2-Way Valve)	TL	Sensor	F	Fuse
43C	Relay (PCB)	TE	Sensor	TR	Transformer
RCo	Running Capacitor	26HD	Bimetal Thermostat	RCC	Running Capacitor (Compressor)

## RAV-261AH8-P

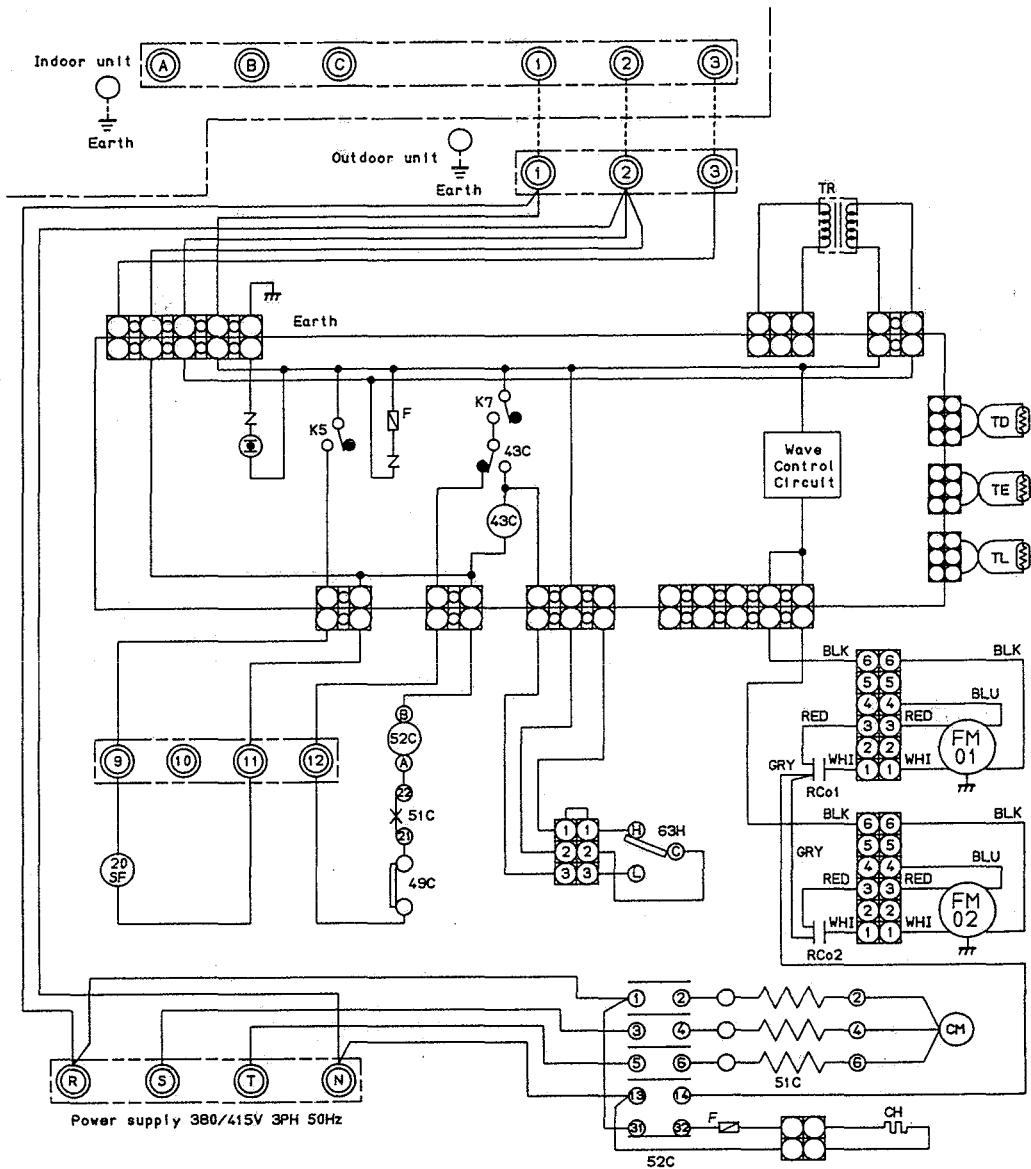


- ① shows terminal block and figures show terminal numbers.  
Broken lines show wiring at site.
- When the three phases are not connected correctly, the reverse phase protector operates and the unit will not start. In this case, check the three phase wiring.

Don't operate the units with the magnetic contactor pushed.

Symbol	Name	Symbol	Name	Symbol	Name
20SF	Solenoid Coil	CM	Compressor	TD	Sensor
K <sub>5</sub> , K <sub>7</sub>	Relay	52C	Magnetic Contactor	63H	High Pressure Switch
49C	Thermostat	FMo	Fan Motor (Outdoor)	CH	Crankcase Heater
51C	Overload Relay	TL	Sensor	F	Fuse
43C	Relay (PCB)	TE	Sensor	TR	Transformer
RCo	Running Capacitor	47C	Reverse Phase Protector		

RAV-361AH8-P  
RAV-461AH8-P



◎ shows terminal block and figures show terminal numbers.  
Broken lines show wiring at site.

Don't operate the units with the magnetic contactor pushed.

Symbol	Name	Symbol	Name	Symbol	Name
20SF	Solenoid Coil	CM	Compressor	TD	Sensor
K <sub>5</sub> , K <sub>7</sub>	Relay	52C	Magnetic Contactor	63H	High Pressure Switch
49C	Inner Overload Relay	FM <sub>01, 02</sub>	Fan Motor (Outdoor)	CH	Crankcase Heater
51C	Overload Relay	TL	Sensor	F	Fuse
43C	Relay (PCB)	TE	Sensor	TR	Transformer
RC <sub>01, 02</sub>	Running Capacitor				

## 4. SPECIFICATIONS OF ELECTRICAL PARTS

RAV-161AH-P

NO.	PARTS NAME	TYPE	SPECIFICATIONS				
6	Compressor	PH250X3-4LS	Output (Rated) 2.0 kW, 2 pole, 220/240V, 1 phase, 50 Hz				
7	Outdoor unit fan motor	SMF-230-39N-1	Output (Rated) 39W, 6 pole, 230V, 1 phase, 50 Hz				
8	Running capacitor for outdoor fan motor	EEP2G405HQA114	AC 400V, 4 $\mu$ F				
9	Magnetic contactor	FMca-1S	AC 220~240V, 50Hz				
10	High pressure switch	HTB-T317	Tripping pressure 30 kg/cm <sup>2</sup> G Resetting pressure 23 kg/cm <sup>2</sup> G				
11	Solenoid coil for four-way valve	LB60012	AC 220~240V				
12	Crankcase heater		AC 240V, 28W				
13	Sensor for defrosting		Maximum input 15.5 mA		$^{\circ}$ C	-12	10
					k $\Omega$	67.5	21.3
14	Fuse		3A				
15	Sensor for cooling operation in low ambient temperature		Maximum input 15.5 mA		$^{\circ}$ C	-12	10
					k $\Omega$	67.5	21.3
16	Solenoid coil for two-way valve	NEV AC 240V	AC 220~240V, 50 Hz				
17	Running capacitor for compressor	MT-44MP456W	AC 440V, 45 $\mu$ F				
18	Transformer (Outdoor unit)	FT34-2	187~264V				
19	Overload relay	OL-177GM15	AC 240V, Tripping temp: 165 $^{\circ}$ C, Resetting temp: 80 $^{\circ}$ C				
20	Bimetal thermostat	CS-7	Tripping temp: 110 $^{\circ}$ C, Resetting temp: 90 $^{\circ}$ C				

**RAV-261AH-P**

NO.	PARTS NAME	TYPE	SPECIFICATIONS			
7	Compressor	PH330X3-4MS	Output (Rated) 2.2 kW, 2 pole, 3 phase, 220/240V, 50 Hz			
8	Outdoor unit fan motor	SMF-230-63N-1	Output (Rated) 63W, 6 pole, 1 phase, 230V, 50 Hz			
9	Running capacitor for outdoor fan motor	EEP2G405HQA114	AC 400V, 4 $\mu$ F			
10	Magnetic contactor	FMca-1S	AC 220~240V, 50 Hz			
11	High pressure switch	HTB-T317	Tripping pressure 30 kg/cm <sup>2</sup> G Resetting pressure 23 kg/cm <sup>2</sup> G			
12	Solenoid coil for four-way valve	LB10018	AC 220~240V			
13	Crankcase heater		AC 240V, 28W			
14	Sensor for defrosting		Maximum input 15.5 mA	°C	-12	10
15	Fuse			kΩ	67.5	21.3
16	Sensor for cooling operation in low ambient temperature		Maximum input 15.5 mA	°C	-12	10
17	Bimetal thermostat	CS-7		kΩ	67.5	21.3
18	Solenoid coil for two-way valve	NEV202DXF	AC 220~240V, 50 Hz			
19	Transformer for outdoor unit	FT34-2	AC 187~264V			
20	Running capacitor for compressor	EAR42M606UF	AC 420V, 60 $\mu$ F			

**RAV-261AH8-P**

NO.	PARTS NAME	TYPE	SPECIFICATIONS			
6	Compressor	YH330X3-MS	Output (Rated) 2.2 kW, 2 pole, 380~415V, 3 phase, 50 Hz			
7	Outdoor unit fan motor	SMF-230-39N-1	Output (Rated) 39W, 6 pole, 230V, 1 phase, 50 Hz			
8	Running capacitor for outdoor fan motor	EEP2G405HQA114	AC 400V, 4 $\mu$ F			
9	Magnetic contactor	FMSA-1	AC 220~240V, 50 Hz, Tripping current: 7.5A, Resetting manual			
10	High pressure switch	HTB-T317	Tripping pressure 30 kg/cm <sup>2</sup> G Resetting pressure 23 kg/cm <sup>2</sup> G			
11	Solenoid coil for four-way valve	LB60012	AC 220V~240V			
12	Crankcase heater		AC 240V, 28W			
13	Sensor for defrosting		Maximum input 15.5 mA	$^{\circ}$ C		-12
				k $\Omega$	67.5	21.3
14	Fuse		3A			
15	Sensor for cooling operation in low ambient temperature		Maximum input 15.5 mA	$^{\circ}$ C		-12
				k $\Omega$	67.5	21.3
16	Thermostat	CS-7	Tripping temp: 120 $^{\circ}$ C, Resetting temp: 90 $^{\circ}$ C			
17	Transformer	FT34-2	AC 187~264V			
18	Return lock	STR-4AB	AC 400/440V			

**RAV-361AH8-P**

NO.	PARTS NAME	TYPE	SPECIFICATIONS			
7	Compressor	YH406JA	Output (Rated) 3.0 kW, 2 pole, 3 phase, 380/415V, 50 Hz			
			Winding resistance 2.88Ω, at 20°C			
8	Outdoor unit fan motor	SMF-230-63N-1	Output (Rated) 63W, 6 pole, 1 phase, 230V, 50 Hz			
		SMF-230-39N-1	Output (Rated) 39W, 6 pole, 1 phase, 230V, 50 Hz			
9	Running capacitor for outdoor fan motor	EEP2G405HQA114	AC 400V, 4 μF			
10	Magnetic contactor	FMSA-1	AC 230V, 50 Hz, Tripping current 9A, Resetting manual			
11	High pressure switch	HTB-T317	Tripping pressure 30 kg/cm²G Resetting pressure 23 kg/cm²G			
12	Solenoid coil	LB60012	AC 220~240V			
13	Crankcase heater		AC 240V, 58W			
14	Outdoor unit sensor for heat-exchanger temp.		Maximum input 15.5 mA	°C	-12	10
				kΩ	67.5	21.3
15	Transformer for outdoor unit	FT34-2	AC 187~264V			
16	Fuse		3A			
17	Sensor for cooling operation in low ambient temperature		Maximum input 15.5 mA	°C	-12	10
				kΩ	67.5	21.3

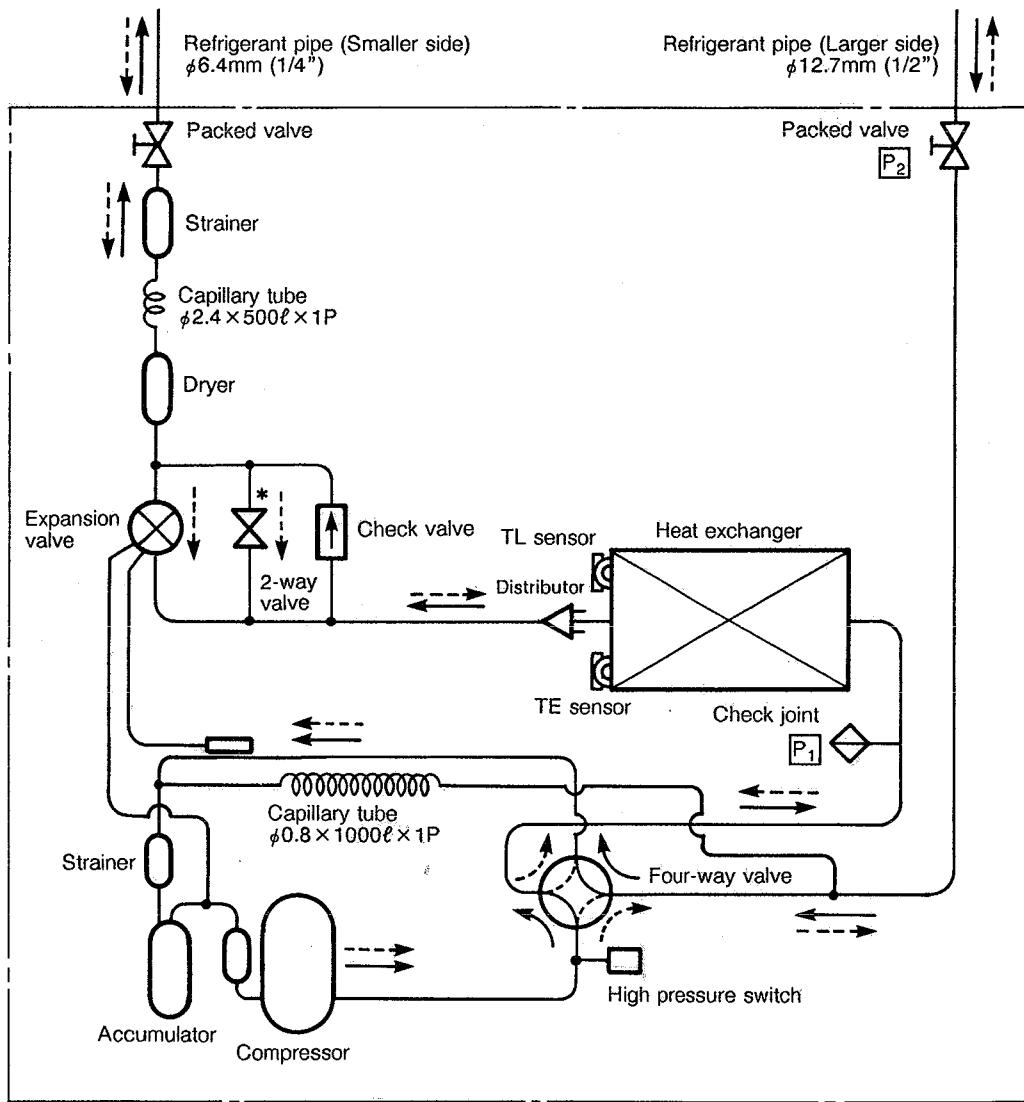
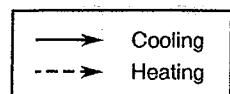
**RAV-461AH8-P**

Different points from above model are shown below and other specifications are the same as above.

NO.	PARTS NAME	TYPE	SPECIFICATIONS			
7	Compressor	YH506JA	Output (Rated) 3.75 kW, 2 pole, 3 phase, 380/415V, 50 Hz			
			Winding resistance 2.29Ω, at 20°C			
10	Magnetic contactor	FMSA-1	AC 230V, 50 Hz, Tripping current 12A, Resetting manual			

## 5. REFRIGERANT PIPING DIAGRAM

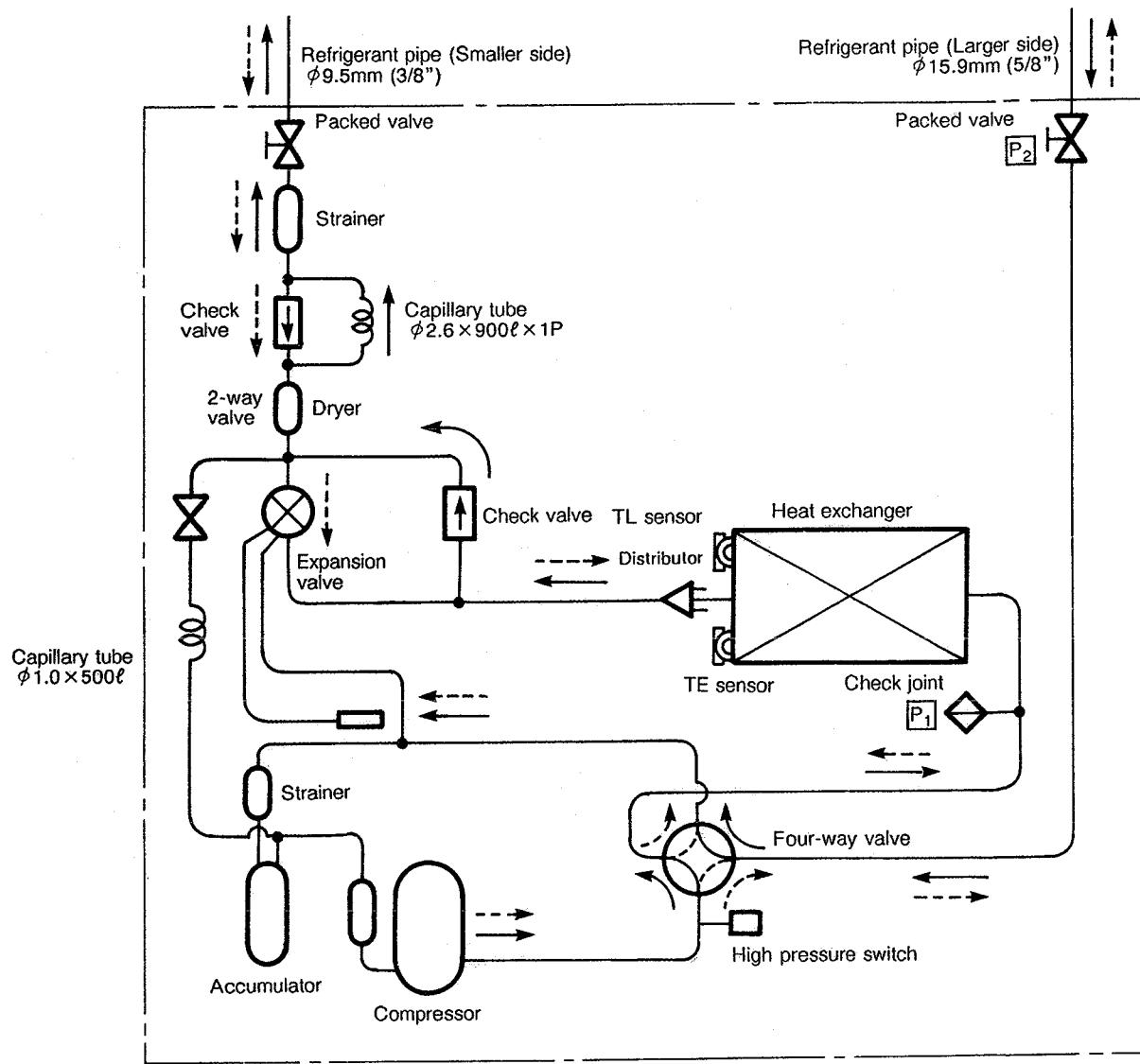
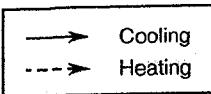
RAV-161AH-P



Line Pressure

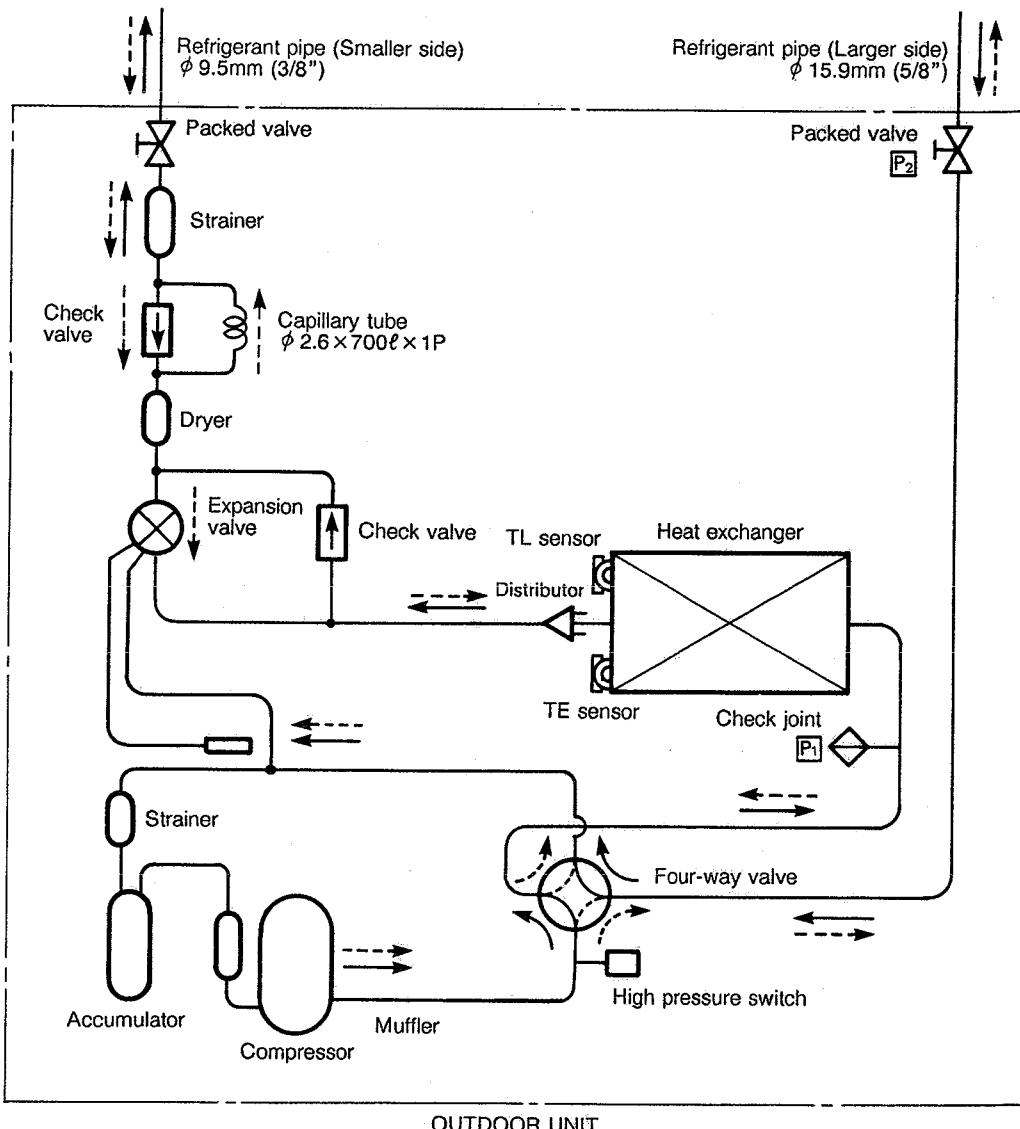
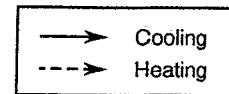
	Cooling	Heating
P <sub>1</sub>	High pressure	Low pressure
P <sub>2</sub>	Low pressure	High pressure

RAV-261AH-P



Line Pressure

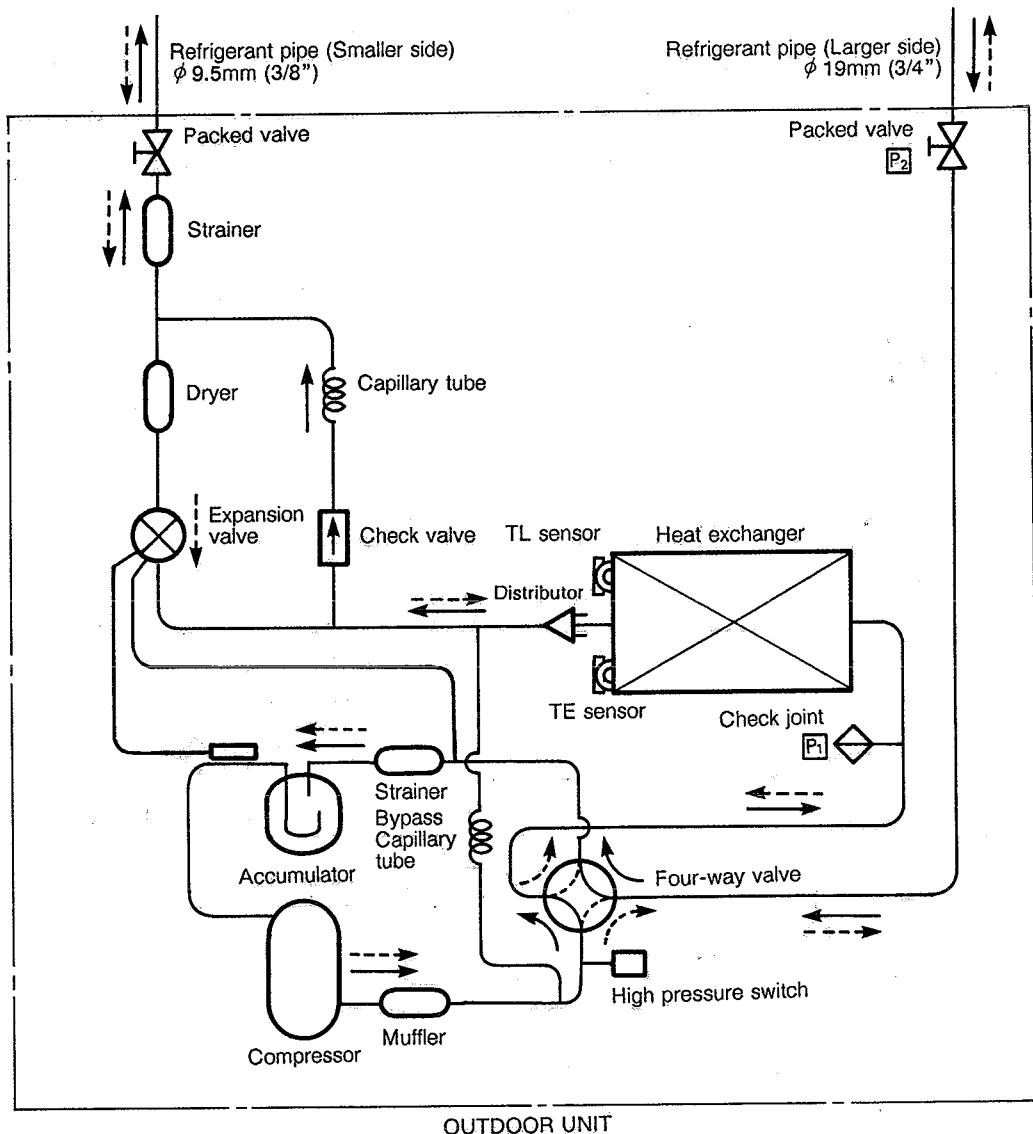
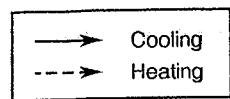
	Cooling	Heating
P <sub>1</sub>	High pressure	Low pressure
P <sub>2</sub>	Low pressure	High pressure



Line Pressure

	Cooling	Heating
P <sub>1</sub>	High pressure	Low pressure
P <sub>2</sub>	Low pressure	High pressure

RAV-361AH8-P  
RAV-461AH8-P



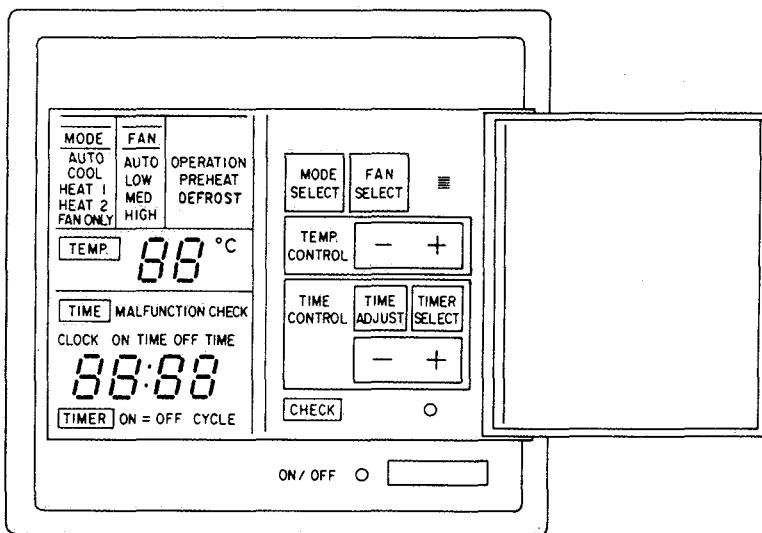
OUTDOOR UNIT

Line Pressure

Model	Capillary tube	Bypass Capillary tube		Cooling	Heating
RAV-361AH8-P	ID φ2.4 × 650ℓ × 1P	ID φ1.7 × 1,000ℓ × 1P	P <sub>1</sub>	High pressure	Low pressure
RAV-461AH8-P	ID φ3 × 600ℓ × 1P	ID φ2 × 1,000ℓ × 1P	P <sub>2</sub>	Low pressure	High pressure

## 6. REMOTE CONTROLLER

### 6.1 Remote controller



BUTTON	INDICATOR		OPERATION
ON/OFF		LED (RED)	Run/Stop
MODE SELECT	MODE	AUTO COOL HEAT 1 HEAT 2 FAN ONLY	Auto Changeover Cooling Heating Heating (with indoor fan operation at defrost) Fan only
FAN SELECT	FAN	AUTO LOW MED HIGH	Auto Fan Speed Control Low Fan Speed Med. Fan Speed High Fan Speed
TEMP. CONTROL	TEMP.	88 °C 88 °F	Temperature setting
TIME ADJUST	TIME	(1) CLOCK (2) ON TIME (3) OFF TIME  88:88	(1) Present Time Adjust (2) ON Time Setting (3) OFF Time Setting
TIMER SELECT	TIMER	ON OFF ON → OFF ON ← OFF CYCLE	ON Timer OFF Timer ON → OFF Timer OFF → ON Timer 24H Cycle Timer

## 6.2 Outline of remote controller's functions

NO.	KEY SWITCH	OUTLINE OF SPECIFICATIONS	REMARKS
1	[ON/OFF]	<p>① When this button is pushed once, the air conditioner is turned on, with the operation lamp coming on.</p> <p>② If pushed once more, it will be turned off, the operation lamp going off.</p> <p>③ If pushed for 5 sec. in the mode of turning on the air conditioner, goes into test run mode.</p>	Fan only after 30 min.
2	MODE SELECT	<p>① Each time this button is pushed, the [MODE] setting is changed over cyclically, [AUTO] → [COOL] → [HEAT1] → [HEAT2] → [FAN ONLY] → [AUTO].</p> <p>② If pushed continuously, the setting will be changed in one step every 0.5 sec.</p>	
3	FAN SELECT	<p>① Each time this button is pushed, the [FAN] setting is changed over cyclically, [AUTO] → [LOW] → [MED] → [HIGH] → [AUTO].</p> <p>② If pushed continuously, the setting will be changed in one step every 0.5 sec.</p>	Fan speed
4	TEMP. CONTROL [+] [-]	<p>① Each time [+] this button is pushed, the [TEMP] setting of temperature is raised by 1°C.</p> <p>② If [+] is pushed continuously, the setting will be raised by 1°C every 0.5 sec.</p> <p>③ Each time [-] button is pushed, the setting of temperature is lowered by 1°C.</p> <p>④ If [-] is pushed continuously, the setting will be lowered by 1°C every 0.5 sec.</p>	In the 18~29° Control range
5	TIME CONTROL TIME ADJUST [+] [-] TIME ADJUST	<p>① Each time [TIME ADJUST] button is pushed, the [TIME] display is changed cyclically. The time can be changed while the TIME display stays flashing.            (flashing) (flashing) (flashing)            [CLOCK] → [CLOCK] → [ON TIME] → [OFF TIME]            [12:00] [12:00] [6:00] [18:00]</p> <p>② While the TIME display stays flashing, the time gains one minute upon each pressing of [+].</p> <p>③ If [+] is pushed continuously, the time gains 10 minutes every 0.25 sec.</p> <p>④ While the TIME display stays flashing, the time goes back one minute upon each pressing of [-].</p> <p>⑤ If [-] is pushed continuously, the time goes back 10 minutes every 0.25 sec.</p> <p>⑥ Each time [TIMER SELECT] button is pushed, timer mode change over cyclically, [ ] (CONTINUE) → [ON] → [OFF] → [ON→OFF] → [ON←OFF] → [CYCLE] → [ ].</p> <p>⑦ If pushed continuously, the timer mode will be changed in one step every 0.5 sec.</p>	If time is not set, 12:00 6:00 18:00 are set automatically.
6	CHECK	<p>① Pressing this key for 0.5 sec. provides [MALFUNCTION CHECK], indicating on liquid crystal the contents of inspection in the sequence of (times of compressor-on) → (contents of malfunction for #1 unit) → (contents of malfunction for #2 unit) →....</p> <p>② Pressing this key for 5 sec. gives "Indoor microcomputer reset mode" to reset the indoor microcomputer by way of hardware.</p> <p>③ Pressing this key for 10 sec. gives "Check contents clear mode" to clear the contents of inspection stored in the remote controller provided, however, times of compressor-on is not cleared.</p>	The indication of the indoor unit which has not any malfunction content is skipped.
7	Reset	<p>① By pressing the reset key, the remote controller is reset by way of hardware. (The setting/display are in initial values with the check memory cleared.)</p>	

### 6.3 Timer operation

Continuous operation and timer operations are available. The setting of timer operation can be done as follows: ON, OFF, ON → OFF, OFF → ON, ON ↔ OFF CYCLE.

#### 6.3.1 Time display

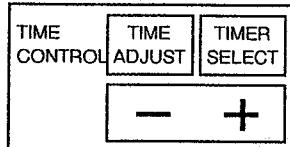
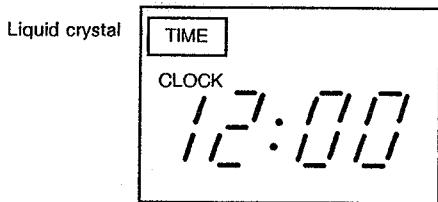
The present time is always displayed

The display of the ON/OFF time is only in setting the time.

Once set, it will not change even after carrying out the timer operation until the timer is reset.

Initial set time	The present time	12:00
	The time of ON	6:00
	The time of OFF	18:00

#### 6.3.2 How to set the time



As to (-) and (+), change takes place by one minute by pressing once and 10 min./0.25 sec. by pressing continuously.

How to set the present time



[TIME ADJUST] switch is pressed.  
[CLOCK] and Time figures flash.

- 1) [TIME ADJUST] switch is pressed. [CLOCK] and Time figures flash.
- 2) Time is set by Time setting switch (-) or (+). The setting is finished when releasing. Pressing [TIME ADJUST] three times gives the display of the present time.  
(If left as it is, after 15 sec. the display will go back to the present time).

How to set ON TIME



[TIME ADJUST] switch is pressed twice.  
[ON TIME] and Time figures flash.

- 1) [TIME ADJUST] switch is pressed twice. [ON TIME] and Time figures flash.
- 2) Time is set by Time setting switch (-) or (+). The setting is finished when releasing. Pressing [TIME ADJUST] twice gives the display of the present time.  
(If left as it is, after 15 sec. the display will go back to the present time).

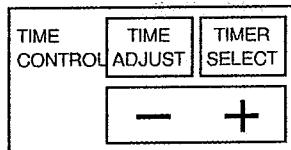
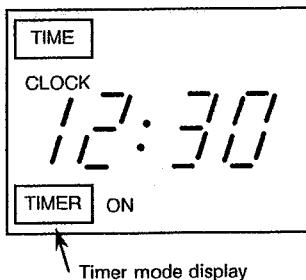
How to set OFF TIME



[TIME ADJUST] switch is pressed three times.  
[OFF TIME] and Time figures flash.

- 1) [TIME ADJUST] switch is pressed three times. [OFF TIME] and Time figures flash.
- 2) Time is set by Time setting switch (-) or (+). The setting is finished when releasing. Pressing [TIME ADJUST] twice gives the display of the present time.  
(If left as it is, after 15 sec. the display will go back to the present time).

### 6.3.3 How to set the timer operation



The following can be chosen sequentially by pressing [TIMER SELECT] switch:

- 1) [TIMER] ON
- 2) [TIMER] OFF
- 3) [TIMER] ON → OFF
- 4) [TIMER] ON ← OFF
- 5) [TIMER] CYCLE

- \* Be sure to set the present time.
- \* In case of reoperating after finishing timer operation, if [TIMER SELECT] is not altered, the timer operation will be performed again.

#### Timer ON operation

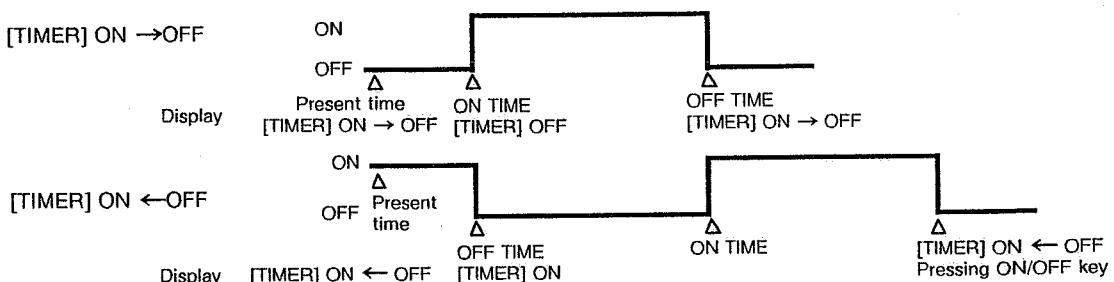
- 1) [TIMER] ON is applied.
- 2) ON/OFF key is pressed. Then LED is lighted.  
When the set [ON TIME] comes, the operation starts and OPERATION display comes on the liquid crystal, and the [TIMER] ON display goes off.
- 3) LED and OPERATION display goes off upon pressing ON/OFF key for stopping and [TIMER] ON is displayed.

#### Timer OFF operation

- 1) [TIMER] OFF is applied.
- 2) ON/OFF key is pressed. Then LED is lighted and the operation starts with OPERATION displayed on the liquid crystal.
- 3) When the set [OFF TIME] comes, the operation stops and the LED, OPERATION display goes off with [TIMER] OFF displayed.

#### ON ↔ OFF timer operation

- 1) [TIMER] ON → OFF or [TIMER] ON ← OFF is applied.
- 2) ON/OFF key is pressed. LED comes on and the operation is performed as below:

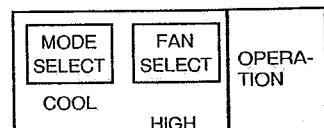


#### Repeated operation

- 1) [TIMER] CYCLE is applied.
- 2) ON/OFF key is pressed. Then LED is lighted and ON ↔ OFF timer operation is repeated according to the ON time and OFF time (repeating every day as it is a 24-hour timer).
- 3) The operation key is pressed. LED goes off and operation stops.

#### Timer stand-by display and operation display

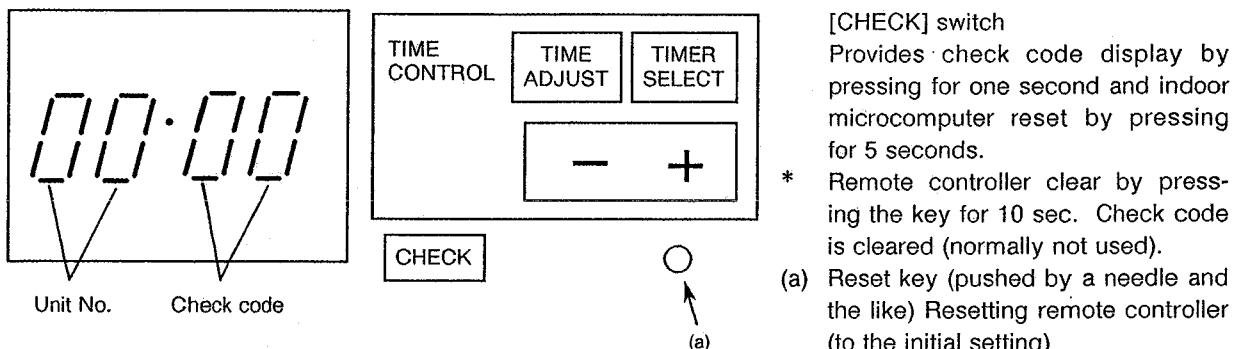
Waiting on the timer is displayed by LED lighting while the actual operation is displayed on OPERATION on liquid crystal.



Displaying actual operation

## 6.4 Malfunction check monitor

6.4.1 The times of thermostat ON as well as the check code are displayed on the time display area by pressing CHECK key.



## Judgement from operation status

	OPERATION STATUS	CODE	CAUSE
1.	Compressor stays off in cooling: it is not turned off in heating.	0C	Open-circuit in room temperature sensor.
	Compressor stays off in heating: it is not turned off in cooling.		Short-circuit in room temperature sensor.
2.	Indoor fan stays off in heating.	0d	Open-circuit in indoor heat-exchanger sensor.
	Outdoor fan continues ON-OFF operation in heating.		Short-circuit in indoor heat-exchanger sensor.
3.	Though indoor unit operates, outdoor unit remains off.	04	Abnormality in connecting cable between indoor and outdoor units.
4.	Indoor fan does not work in heating operation. Warm air comes out in cooling operation.	08	4-way valve coil burnt out, pipe clogged, abnormality in indoor heat-exchanger sensor.
5.	Indoor fan at LOW speed in cooling operation with the outdoor remaining in stoppage.	09	Refrigerant gas in shortage. Abnormality in indoor heat-exchanger sensor.
6.	Full stop	18	Open or short-circuit in outdoor TE sensor.
7.	Full stop	19	Open or short-circuit in outdoor TL sensor.
8.	Full stop	21	Pressure switch does not reset within the set time.
9.	Indoor unit does not operate at all.	99	Abnormality in connecting cable between remote controller and indoor units.
10.*	Though indoor unit operates, outdoor unit remains off.	0b	Abnormality in drain system. Fault of drain pump. Drain pipe clogged.

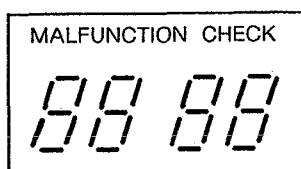
\* With drain pump units only

Note: If the red LED on the remote controller does not flash when the system is switched on, then the wiring to the outdoor unit needs to be checked to ensure that the three phases are wired in the correct sequence. (RAV-261AH8 unit only.)

#### 6.4.2 How to read malfunction check monitor display

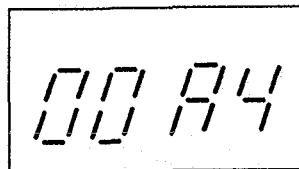
By pressing [CHECK] key, times of No.1 unit compressor-ON actuations as well as the check code information of 2 faults × 16 units are displayed on the time display area. (2 sec. per one phenomenon)

<Times of compressor-ON>



Display in 4 digits of hexa-decimal notation

Ex. In case of the number of times of compressor actuations of 164.

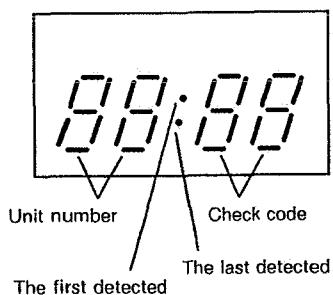


$$16^3 \times 0 + 16^2 \times 0 + 16 \times 10 + 4 = 164$$

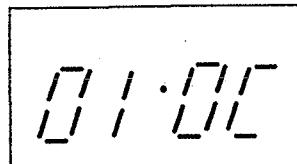
Display in 7 segments



<Check code information>

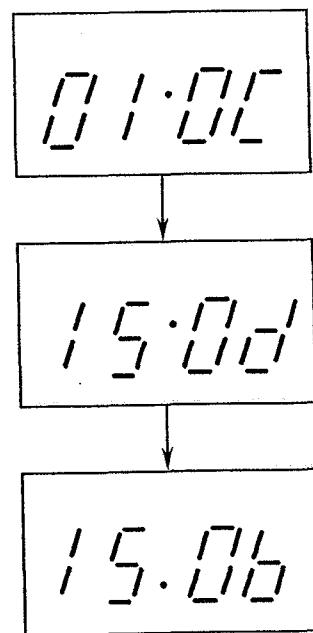


Ex. In case of room temperature sensor of No.1 unit in trouble.

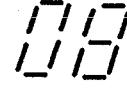
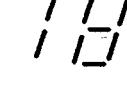


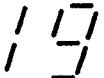
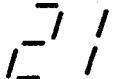
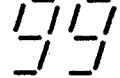
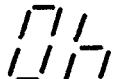
For No.15 unit, firstly heat exchanger temperature sensor and secondly float switch circuit are faulty.

No display is made if there is no fault.



#### 6.4.3 List of Check Code

DIAGNOSTIC FUNCTIONS			JUDGEMENT AND ACTION				
CHECK CODE	SYMPTOM	STATUS OF AIR CONDITIONER					
	<p>ROOM TEMP. SENSOR (TA).</p> <p>Out of place, break, short-circuit.</p>	Operation continuing	<ol style="list-style-type: none"> <li>1. Check for indoor temp. sensor.</li> <li>2. Check for indoor PC board.</li> </ol>				
	<p>INDOOR HEAT-EXCHANGER SENSOR (TC).</p> <p>Out of place, break, short-circuit.</p>	Operation continuing	<ol style="list-style-type: none"> <li>1. Check for indoor heat-exchanger sensor.</li> <li>2. Check for indoor PC board.</li> </ol>				
	<p>RETURN SIGNAL NOT COMING TO INDOOR</p> <p>1) Wrong wiring in connecting cable (serial signal).</p>	Operation continuing	<ol style="list-style-type: none"> <li>1. If outdoor unit does not work at all.           <ol style="list-style-type: none"> <li>(1) Check for connecting cable correct wrong wiring.</li> <li>(2) Check for outdoor PC board.</li> </ol> </li> <li>2. If operates normally.           <p>Between indoor terminal plates 2 and 3, return signal is :</p> <table> <tr> <td>Available:</td> <td>Check for indoor PC board.</td> </tr> <tr> <td>Not available:</td> <td>Check for outdoor PC board.</td> </tr> </table> </li> </ol>	Available:	Check for indoor PC board.	Not available:	Check for outdoor PC board.
Available:	Check for indoor PC board.						
Not available:	Check for outdoor PC board.						
	<p>4-WAY VALVE SYSTEM</p> <p>1) Indoor heat-exchanger temperature rises, after starting cooling operation.</p> <p>2) Indoor heat-exchanger temperature drops after starting heating operation.</p>	Operation continuing	<ol style="list-style-type: none"> <li>1. Check for 4-way valve.</li> <li>2. Check for 2-way valve and check valve.</li> <li>3. Wrong with indoor heat exchanger sensor.</li> <li>4. Check for indoor PC board.</li> </ol>				
	<p>OTHER CYCLE SYSTEM</p> <p>1) Indoor heat exchange temperature does not change after starting cooling/heating operation.</p> <p>2) When transmitting instruction for stopping compressor by freeze preventing control.</p>	<p>Operation continuing</p> <p>Outdoor unit stops (indoor fan L)</p>	<ol style="list-style-type: none"> <li>1. Compressor case thermostat, IOL, OL operation. (contactor OFF, compressor stops: AH8 Models) (contactor ON, compressor stops: AH Models)</li> <li>2. Indoor heat-exchange sensor out of place.</li> <li>3. Check for indoor PC board.</li> <li>4. Check that service valves are OPEN.</li> </ol> <ol style="list-style-type: none"> <li>1. Check for charged amount of refrigerant gas. (Gas shortage → gas supplement, check for gas leaks)</li> <li>2. Indoor fan locked.</li> </ol>				
	<p>DEFROST SENSOR (TE)</p> <p>Out of place, break, short-circuit.</p>	Full stop	<ol style="list-style-type: none"> <li>1. Check for defrosting sensor.</li> <li>2. Check for outdoor PC board.</li> </ol>				

	OUTDOOR HEAT-EXCHANGER SENSOR (TL)	Full stop	<ol style="list-style-type: none"> <li>1. Check for outdoor heat-exchanger sensor.</li> <li>2. Check for outdoor PC board.</li> </ol>
	HIGH PRESSURE SWITCH	Full stop	<ol style="list-style-type: none"> <li>1. Check for high pressure switch.</li> <li>2. Check for outdoor PC board.</li> </ol>
	High pressure switch does not reset. ( 5 sec : in cooling ) ( 30 sec : in heating )		
	OTHER ABNORMALITY OF OUTDOOR UNIT	Full stop	<ol style="list-style-type: none"> <li>1. Check for compressor.</li> <li>2. Check for wiring of compressor. (lack of phase, short circuit)</li> <li>3. Check for voltage.</li> <li>4. Check for outdoor PC board.</li> </ol>
	WRONG WIRING OF REMOTE CONTROL UNIT	Full stop	<ol style="list-style-type: none"> <li>1. Check for wiring between remote control unit and indoor unit.</li> <li>2. Check for indoor unit PC board.</li> </ol>
 *	FLOAT SWITCH	Outdoor unit stops	<ol style="list-style-type: none"> <li>1. Fault in drain pump.</li> <li>2. Drain pipe clogged.</li> <li>3. Check for indoor PC board.</li> </ol>
	Float circuit out of position, break.		

\* With drain pump unit only.

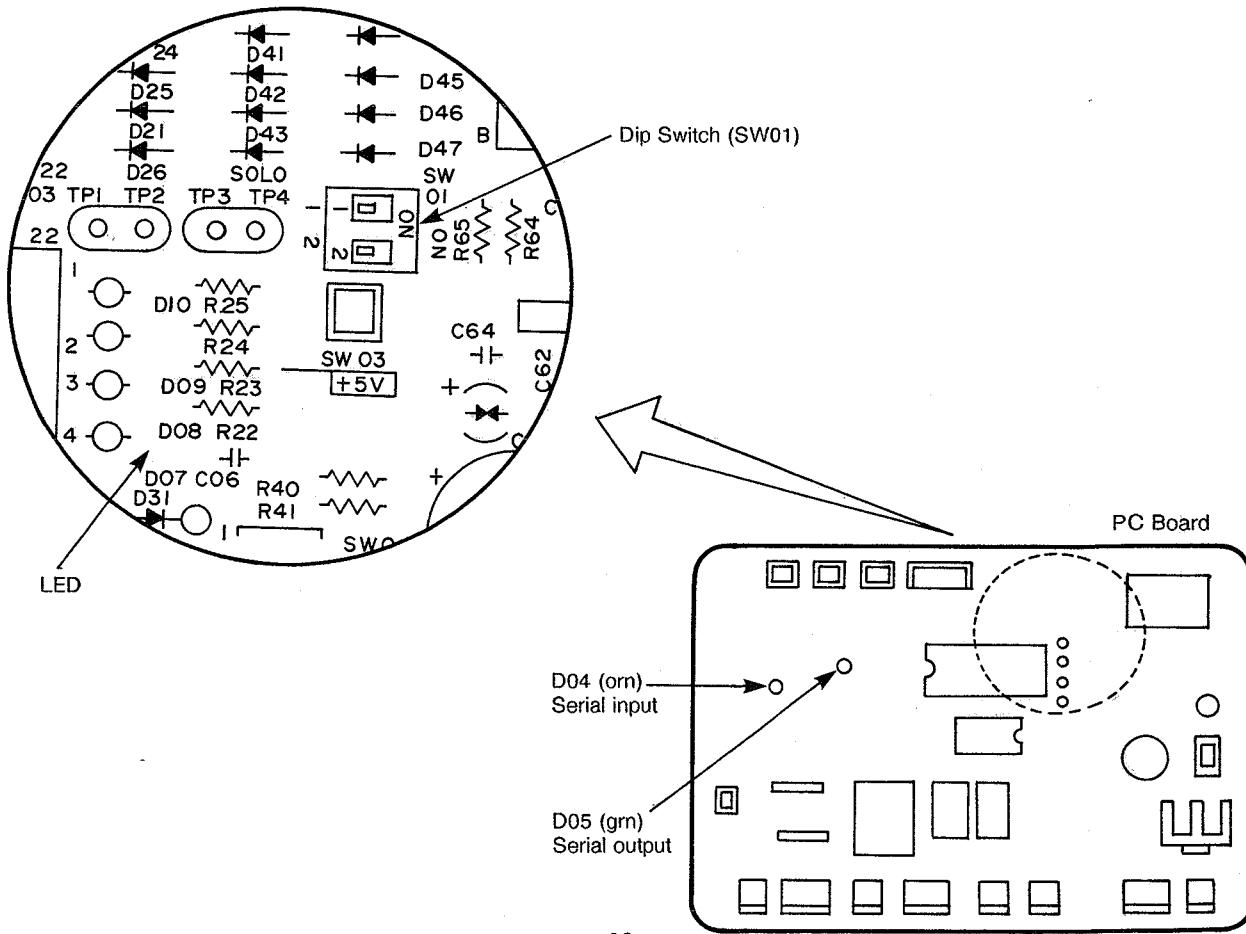
## 6.5 Malfunction check

### 6.5.1 Using LED display on outdoor PC board

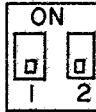
LED display vs. check code

	Dip switch settings (DSW01)	LED			
		1 (Red)	2 (Yellow)	3 (Yellow)	4 (Yellow)
Table-1					21 High pressure switch fault
Table-2		18 Temp. sensor (TE) faulty 19 Temperature sensors TD/TL open/short circuit.			Number of protective device operations
Table-3				Serial input data	
Table-4				Serial output data	

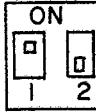
POSITIONS OF DIP SWITCH AND LED



<Table-1>

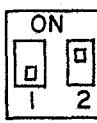
Dip switch settings	LED				Judgement
	1	2	3	4	
	●	●	●	●	Normal operation
	●	●	●	●	Timer short
	○	○	○	●	21 High pressure switch fault
	○	○	○	○	18, 19 Fault codes (Refer to Table-2.)

<Table-2>

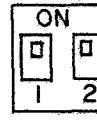
Dip switch settings	LED				Judgement
	1	2	3	4	
	●	●	●	●	Normal operation
	●	●	●	○	Number of protective device operations : one
	●	●	○	●	Number of protective device operations : two
	●	●	○	○	Number of protective device operations : three
	LEDs 3 & 4 flashing (1Hz) faults shown below.		○	○	Number of protective device operations : four
	●	○	○	●	18 Temperature sensor (TE) faulty 19 Temperature sensors (TD/TL) open/short circuit
	○	○	○	●	21 High pressure switch faulty

LED Status	
○	: on
●	: 5Hz flash
○	: 1Hz flash
●	: off

<Table-3>

Dip switch setting	LED				Status of compressor
	1	2	3	4	
	●	●	●	●	Stop
	●	●	○	○	
	●	○	●	●	
	●	○	●	○	
	●	○	○	●	
	●	○	○	○	
	○	●	●	●	Operating
	○	●	●	○	
	○	●	○	●	
	○	●	○	○	
	○	○	●	●	
	○	○	○	●	

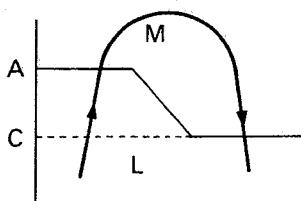
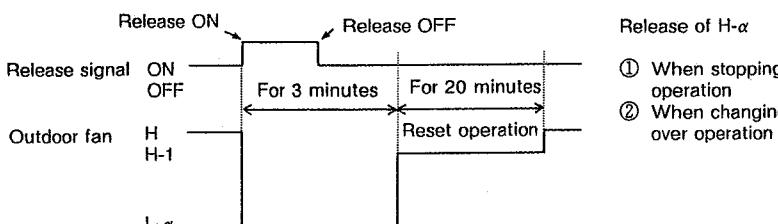
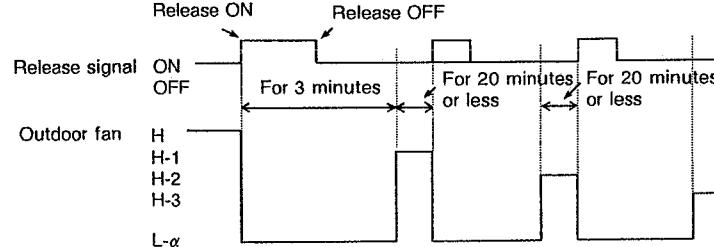
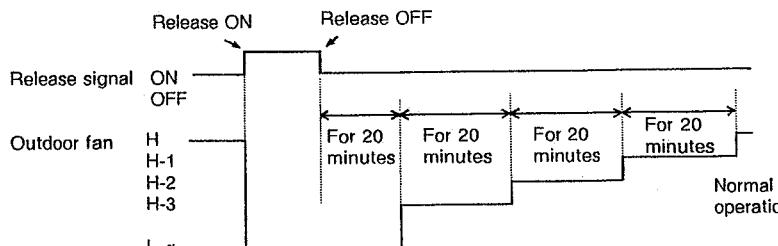
<Table-4>

Dip switch setting	LED				Status of compressor
	1	2	3	4	
	●	●	●	●	Stop
	●	●	○	○	
	●	○	●	●	
	●	○	●	○	
	●	○	○	●	
	●	○	○	○	
	○	●	●	●	Operating
	○	●	●	○	
	○	●	○	●	
	○	●	○	○	
	○	○	●	●	
	○	○	○	●	

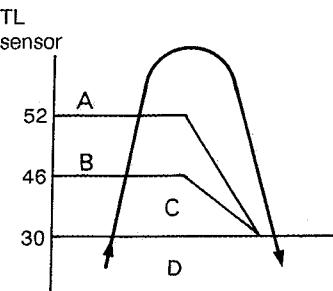
## 7. OUTLINE OF CONTROL CIRCUIT

NO.	ITEM	OUTLINE OF SPECIFICATIONS		REMARKS														
1	Discrimination	Discrimination of outdoor unit is performed either in the reset of power source or when stopping from operating condition, and the controlling is changed over in accordance with the result of discrimination.																
2	Operation change-over	<p>Operation mode is changed over according to operation mode select instruction from the remote controller.</p> <table border="1"> <thead> <tr> <th>REMOTE CONTROLLER INSTRUCTION</th> <th>OUTLINE OF CONTROL</th> </tr> </thead> <tbody> <tr> <td>Stop</td> <td>Stopping air conditioner</td> </tr> <tr> <td>Auto</td> <td>Performing automatic change-over</td> </tr> <tr> <td>Cool</td> <td>Performing cooling operation</td> </tr> <tr> <td>Heat 1</td> <td>Performing heating operation</td> </tr> <tr> <td>Heat 2</td> <td>Performing heating operation with indoor fan operation at defrosting</td> </tr> <tr> <td>Fan only</td> <td>Performing fan only operation</td> </tr> </tbody> </table>		REMOTE CONTROLLER INSTRUCTION	OUTLINE OF CONTROL	Stop	Stopping air conditioner	Auto	Performing automatic change-over	Cool	Performing cooling operation	Heat 1	Performing heating operation	Heat 2	Performing heating operation with indoor fan operation at defrosting	Fan only	Performing fan only operation	
REMOTE CONTROLLER INSTRUCTION	OUTLINE OF CONTROL																	
Stop	Stopping air conditioner																	
Auto	Performing automatic change-over																	
Cool	Performing cooling operation																	
Heat 1	Performing heating operation																	
Heat 2	Performing heating operation with indoor fan operation at defrosting																	
Fan only	Performing fan only operation																	
3	Controlling room temperature	<p>3-1 Adjusting range (°C)</p> <table border="1"> <thead> <tr> <th></th> <th>In cooling</th> <th>In heating</th> </tr> </thead> <tbody> <tr> <td>Remote controller setting temperature</td> <td>18 ~ 29</td> <td>18 ~ 29</td> </tr> <tr> <td>Operating temperature</td> <td>18 ~ 29</td> <td>20 ~ 31</td> </tr> </tbody> </table> <p>3-2 Operating point is compressor - off.    3-3 Operating temperature accuracy: ±1°C.    3-4 Differential: 1 deg</p>			In cooling	In heating	Remote controller setting temperature	18 ~ 29	18 ~ 29	Operating temperature	18 ~ 29	20 ~ 31						
	In cooling	In heating																
Remote controller setting temperature	18 ~ 29	18 ~ 29																
Operating temperature	18 ~ 29	20 ~ 31																
	Correcting temperature compensation	<p>3-5 Room temperature controlled in the heating operation can be corrected by dip switch of indoor microcomputer.</p> <table border="1"> <thead> <tr> <th>Dip switch 1 Setting 2</th> <th>ON ON</th> <th>ON OFF</th> <th>OFF ON</th> <th>OFF OFF</th> </tr> </thead> <tbody> <tr> <td>Control temperature compensation</td> <td>0deg</td> <td>2deg</td> <td>4deg</td> <td>6deg</td> </tr> </tbody> </table>		Dip switch 1 Setting 2	ON ON	ON OFF	OFF ON	OFF OFF	Control temperature compensation	0deg	2deg	4deg	6deg	Ts(Max) = 35°C				
Dip switch 1 Setting 2	ON ON	ON OFF	OFF ON	OFF OFF														
Control temperature compensation	0deg	2deg	4deg	6deg														

NO.	ITEM	OUTLINE OF SPECIFICATIONS	REMARKS
4	Fan speed control	<p>4-1 [HIGH], [MED], [LOW] and [AUTO] are available.          4-2 [Ultra low] or [Stop] when thermostat is turned off while heating is being performed.          4-3 In the auto fan, the fan speed is changed by the difference between <math>T_a</math> and <math>T_s</math>, as shown below.</p>	[Stop] is cold draft prevention by $T_c$ .
5	Cold draft preventing control	<p>When performing heating operation, indoor fan control is carried out as follows based on temperature detection of <math>T_c</math> sensor.</p> <p>C zone: Depending upon fan speed setting of the remote controller          B zone: Indoor fan at "L"          A zone: Fan stop</p>	
6	Freeze preventing control (Low temp. release)	<p>When performing cooling operation, the following control is done based on temperature detection of <math>T_c</math> sensor.</p> <ol style="list-style-type: none"> <li>① When starting the operation, the point P is made +3°C.</li> <li>② When [J] zone is detected, timer counting starts.</li> <li>③ When [K] zone is detected, timer counting is discontinued and held on.</li> <li>④ When [I] zone is detected, timer is cleared for returning back to ordinary operation.</li> <li>⑤ When timer counting becomes full time, the outdoor unit stops and the point P is changed to +12°C to be covered by check display.</li> </ol> <p>When [I] zone is reached, the temperature is returned back to +3°C.</p>	<p>Full Time          MIN 7 min.          MAX 20 min.</p>

NO.	ITEM	OUTLINE OF SPECIFICATIONS	REMARKS																					
7	High temperature release control	<p>When performing heating operation, the following control is done based on temperature detection of Tc sensor.</p> <p>① In [M] zone, release signal is transmitted. Outdoor fan is controlled in accordance with the diagrams below.</p> <p>② The control point for A and C can be chosen from the below table:</p>  <table border="1" data-bbox="468 515 1102 627"> <tr> <td>Dip switch Setting</td> <td>3</td> <td>ON</td> <td>ON</td> <td>OFF</td> <td>ON</td> <td>OFF</td> </tr> <tr> <td></td> <td>4</td> <td>ON</td> <td>OFF</td> <td>ON</td> <td>OFF</td> <td>OFF</td> </tr> <tr> <td>A/C (°C)</td> <td>54/52</td> <td>58/56</td> <td>60/58</td> <td>-</td> <td>-</td> <td>-</td> </tr> </table> <p>Single release</p>  <p>Release of H-α</p> <ul style="list-style-type: none"> <li>① When stopping operation</li> <li>② When changing over operation</li> </ul> <p>Duplicate release</p>  <p>Reset operation</p>  <p>When the high temperature release is received, the release control continues for 3 minutes at least even if release is performed on the way, and H-1 is performed for 20 minutes and the machine returns to normal operation.</p> <p>When the release signal continues for more than 3 minutes, H-1 operation of outdoor fan control is performed at the same time as releasing the release and the machine returns to normal operation.</p> <p>When the high temperature release is received during operation of H-1 for 20 minutes, operation of the previous time -1 of reset operation is performed for 20 minutes after release operation.</p> <p>If the release signal is not received during reset operation for 20 minutes, reset operation of +1 per 20 minutes is performed and the machine returns to normal operation.</p> <p>The high temperature release control is ignored during defrosting operation.</p>	Dip switch Setting	3	ON	ON	OFF	ON	OFF		4	ON	OFF	ON	OFF	OFF	A/C (°C)	54/52	58/56	60/58	-	-	-	
Dip switch Setting	3	ON	ON	OFF	ON	OFF																		
	4	ON	OFF	ON	OFF	OFF																		
A/C (°C)	54/52	58/56	60/58	-	-	-																		

NO.	ITEM	OUTLINE OF SPECIFICATIONS	REMARKS
8	Residual heat removal	When stoppage takes place in [HEAT 2] operation, indoor fan is operated in [LOW] for 30 sec.	
9	Test operation	9-1 If Remote controller's ON/OFF switch is pressed 5 seconds continuously, the unit goes into test run mode with the indoor fan in the [HIGH]. 9-2 After continuing the operation for 30 minutes, [Fan only] operation is initiated.	
10	High pressure release	<p>The following control is performed when high pressure switch of the outdoor unit is actuated.</p> <p>① In cooling operation Compressor is turned off and if the high pressure switch does not reset for 5 seconds continuously thereafter, it is judged abnormal.</p> <p>② In heating operation Compressor is turned off and if the high pressure switch does not reset for 30 seconds continuously thereafter, it is judged abnormal. If the switch resets within 30 sec., the compressor restarts 2 minutes and 20 sec. later and operates according to the diagram below.</p> <p>* When the outdoor fan H is restricted to (H-<math>\alpha</math>) in the high temperature release, H in the above figure is (H-<math>\alpha</math>).</p> <p>③ In defrosting operation Compressor is turned off, the operation returning back to heating operation.</p>	<p>&lt;Outdoor unit control&gt; LED lamp comes on in abnormal condition, being abnormal code transmitted to indoor unit.</p>
11	Protection at the time of Mg-SW fusing	If the high pressure SW continues to operate for 5 seconds while the compressor is stopping, fusing of Mg-SW is detected and the outdoor fan is controlled as described below.	
		<p>① When the four-way valve is OFF (including during defrosting operation) Turn ON the outdoor fan using "H".</p> <p>② When the four-way valve is ON Turn OFF the outdoor fan. (When the compressor is stopping, the outdoor fan should be OFF)</p>	
12	Defrosting	<p>12-1 In heating operation, defrosting is made based on outdoor heat exchange temperature Te.</p> <p>12-2 When cumulative working time of the compressor in [A] zone has amounted to 55 minutes, defrosting operation starts. (25 minutes initially)</p> <p>12-3 The longest defrosting time is 12 minutes, 60 sec. in the case of turning into [B] zone, and immediate returning back when [C] zone is reached.</p>	<p>&lt;Outdoor unit control&gt;</p>
13	Four-way valve reversal control	The following control shall be performed when the compressor stops:	
		<p>① The 4-way valve in the hold state shall be reversed 10 seconds before the restart delay timer counts the maximum count (2 minutes 20 seconds).</p> <p>② After the restart delay timer counts the maximum value, the specified mode shall be selected.</p>	

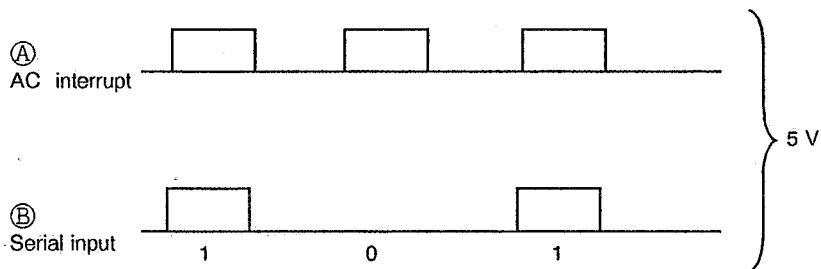
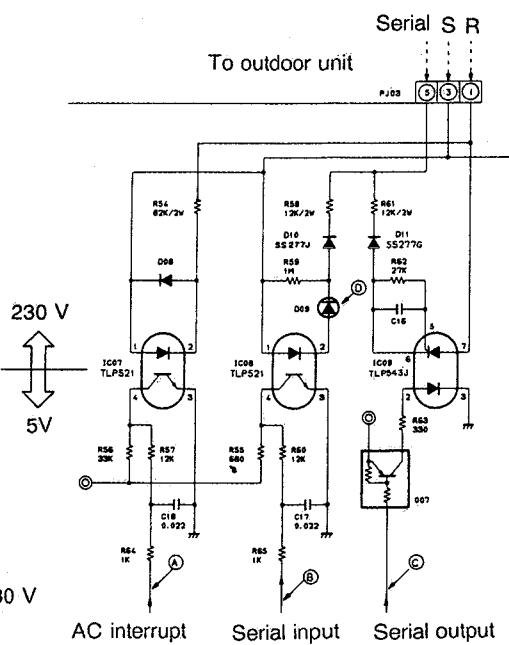
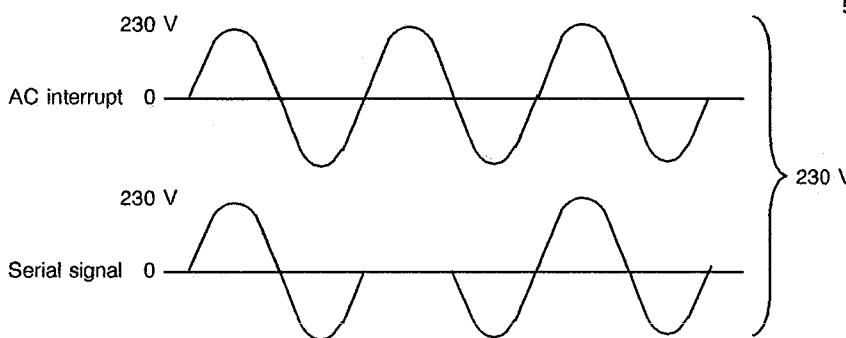
NO.	ITEM	OUTLINE OF SPECIFICATIONS	REMARKS										
14	Low ambient cooling	<p>14-1 Control on outdoor fan is made to meet with cooling at low outdoor temperature based on outdoor heat exchange temperature TL.</p> <p>14-2 Control by outdoor heat exchange temperature TL is illustrated in the right.</p> <p>14-3 For first 2 minutes after starting cooling operation, the fan(s) operate in "H" speed.</p>  <table border="1" data-bbox="468 604 888 873"> <thead> <tr> <th></th> <th>Air quantity</th> </tr> </thead> <tbody> <tr> <td>A zone</td> <td>H</td> </tr> <tr> <td>B zone</td> <td>Per 1 minute and 30 sec. +1 wave</td> </tr> <tr> <td>C zone</td> <td>Maintain</td> </tr> <tr> <td>D zone</td> <td>Per 20 sec. -1 wave</td> </tr> </tbody> </table> <p>+1 wave, -1 wave is (current number of waves) <math>\pm</math> (1 wave)</p> <p>Timer accuracy : <math>20 \frac{+0}{-10}</math> sec., 1 minute and 30 sec. <math>\frac{+0}{-10}</math> sec.</p> <p>Air quantity "M" automatic control</p>		Air quantity	A zone	H	B zone	Per 1 minute and 30 sec. +1 wave	C zone	Maintain	D zone	Per 20 sec. -1 wave	<Outdoor unit control>
	Air quantity												
A zone	H												
B zone	Per 1 minute and 30 sec. +1 wave												
C zone	Maintain												
D zone	Per 20 sec. -1 wave												
15	Check display	Fault diagnosis is carried out by check for serial signal transmission and reception with outdoor unit as well as the self check by indoor microcomputer. And check code is transmitted to protective operation/remote controller based on the contents of it. In the remote controller, check code is displayed on the liquid crystal by pressing [CHECK] key.	See other item: Using [TIME] display 										
16	Anti-restart timer	The outdoor unit delays restarting for 2 mins 20s to prevent short cycling compressor operation.											
17	Group operation control	Up to 16 units can be controlled in same setting condition by one remote controller. However, thermo-control function is independent. Respective delayed start time for preventing simultaneous large starting current can be by different setting of the unit No. switch on the indoor PC board.											

## 8. DESCRIPTION OF INDOOR UNIT CONTROL CIRCUIT

### 8.1 Serial signal circuit (between outdoor and indoor units)

This is a circuit for transmitting and receiving the signals between the indoor and outdoor units in serial signal. As 230V is used for transmitting the signal, the microcomputer section is insulated by means of photo-coupler with the voltage reduced to 5V.

With AC interrupt, judgement is made as to the presence or absence of serial signal based on the reference pulse taken out from the voltage across R and S.

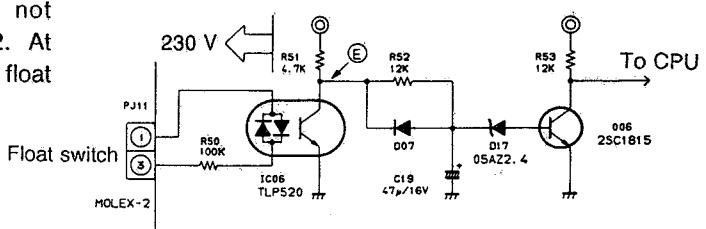


(A)/(B) .... are measurement points on the printed circuit board.

(D) provides flashing (orange) on LED in the serial input.

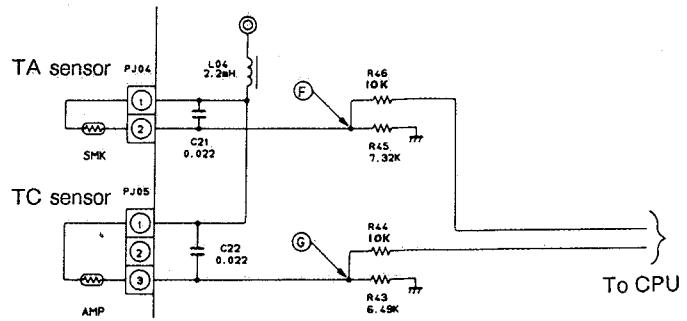
### 8.2 Float switch circuit

In normal condition in which float switch is not operated, 230V is applied across the pins 1 and 2. At this time, point (E) is at the GND level. If the float switch is operated, (E) will be at the level of 5V.



### 8.3 Sensor circuit

This circuit detects the temperature by dividing voltage with resistance and sensor and bringing the voltage value into CPU, using the characteristics of the sensor that resistance varies with different temperatures. TA and TC have the same circuit composition.



When TA and TC are at 25°C approximately, the voltage level is some 2V both at points F and G. If F / G are at GND or 5V, abnormal condition prevails such as opening or short-circuit of the sensor.

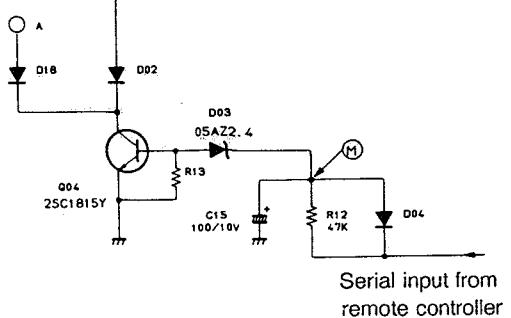
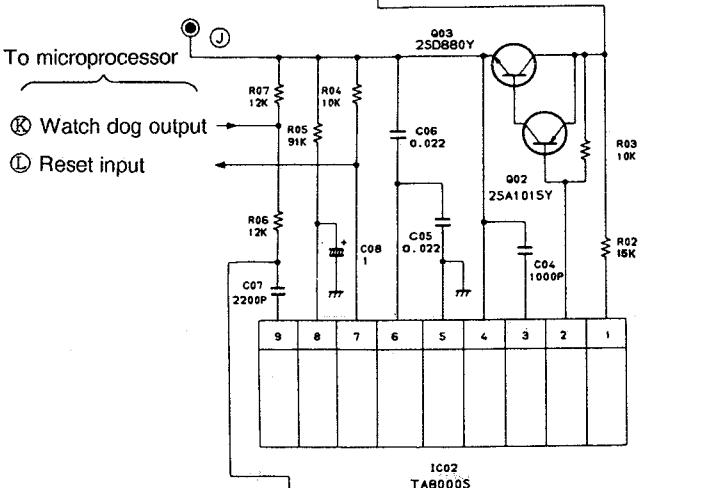
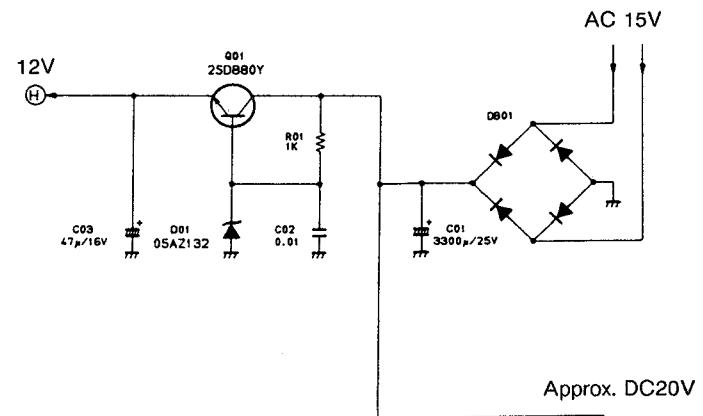
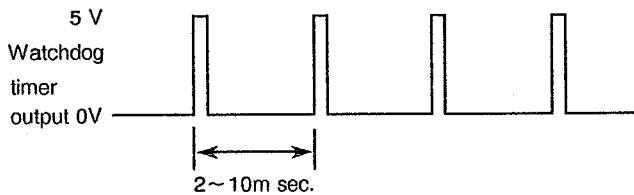
### 8.4 12V power source circuit

Full-wave rectification by diode bridge (DB01) of alternate current supplied from power transformer followed by the provision of transistor (Q01) gives DC12V power source (H).

### 8.5 5V watchdog timer circuit

Built-in IC (TA8000S) is used to produce 5V power source (J). Also, it sends signals to reset port (I) of microcomputer which is in stand-by at 0V and starts its operation with the signal of 5V.

Watchdog timer output (K) gives the signal from microcomputer as illustrated below. This indicates that the microcomputer is working in normal routine. For example if the microcomputer is straying due to noise and so on, this waveform is not produced. In case there is no waveform, it plays the role of restoring normal condition by inputting the resetting "0V" to the microcomputer.



### 8.6 Reset circuit

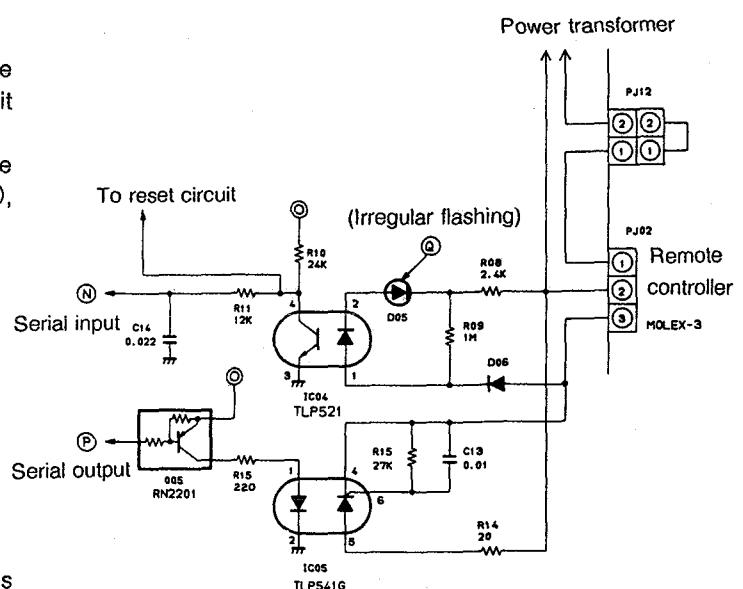
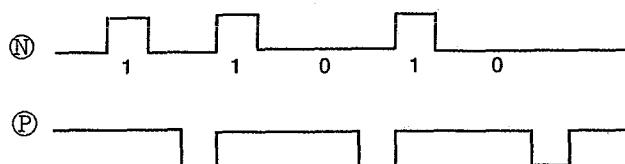
This circuit makes indoor microcomputer reset by way of hardware when you keeps on pressing the check key of remote controller for longer than a predetermined period. It plays the role of resetting microcomputer from the remote controller when it strays. The point (M), which is normally at the level of 5V, drops down to the GND level in the reset operation.

## 8.7 Serial signal circuit

(Between remote controller and indoor unit)

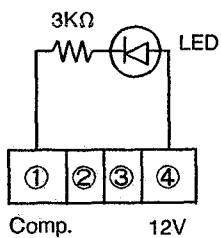
This is the circuit for transmitting and receiving the signals between the remote controller and indoor unit in serial signal.

Point ① is a LED (green) which flashes when there are signals from the remote controller. At ② and ③, the signals as illustrated below are output.



A circuit which allows for the take-out of the signals of abnormal, operation and Compressor-ON. Point ④ is a LED which lights at abnormal.

The connector pin 1 outputs 12V. When you want to see the signal of compressor-ON, you can do it simply with the circuit below.

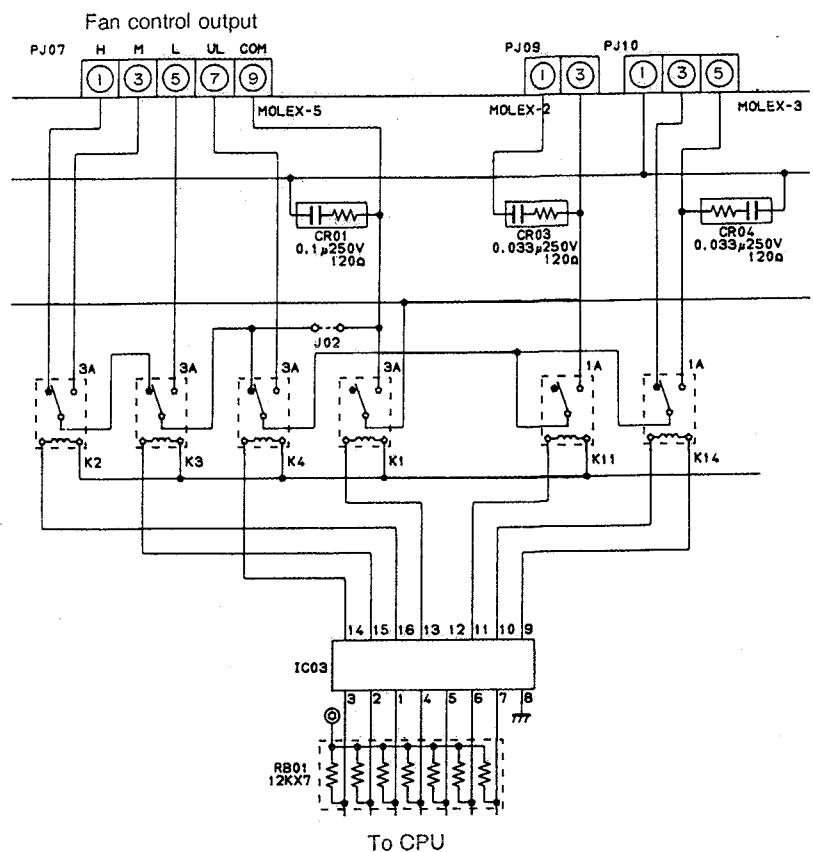


## 8.9 Relay circuit

The relay circuit consists of the diagram in the righthand side.

The relay performs the following functions:

- K1: Turning fan on and off
- K2: Changing over H/M of fan
- K3: L tap of fan
- K4: UL tap of fan
- K11: Turning louver on and off
- K14: Turning drain pump on and off  
(① – ③)

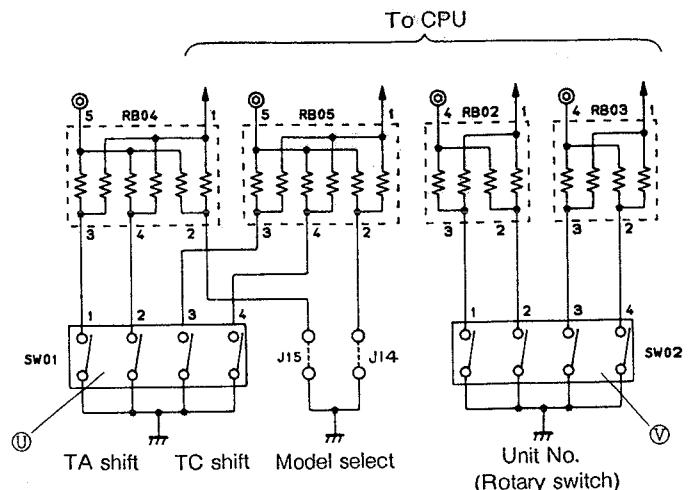


## 8.10 Switch circuit

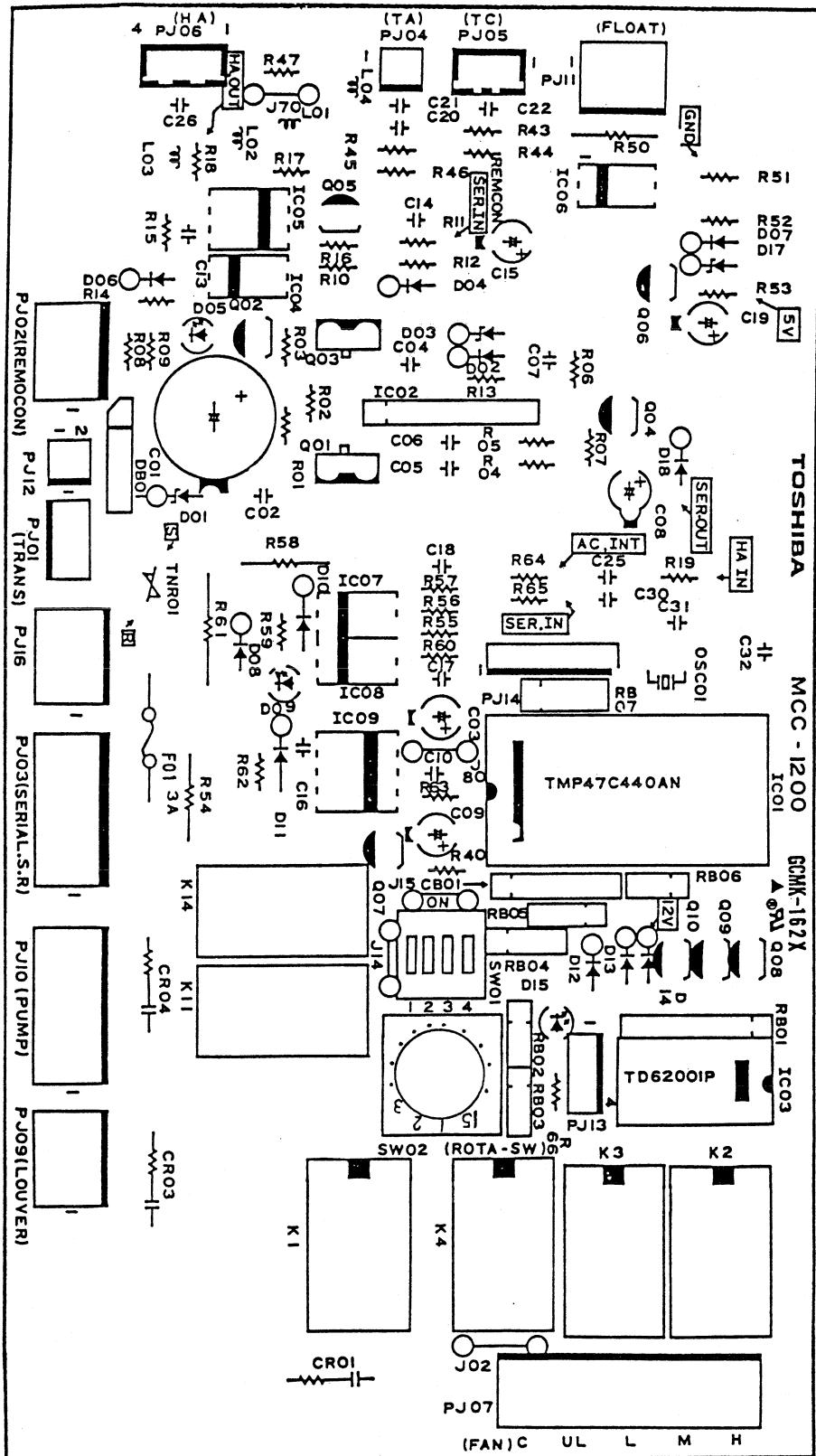
TA shift, TC shift and unit No. are changed over by the switch.

TA shift and TC shift are set in factory with unit No. at "1".

In servicing, the setting should be made to the same TA/TC shift as the PC board attached originally. In case of operating one single unit, unit No. "1" will do. With the operation of many units (multi units control) the unit No. should be adjusted in such a way as 1, 2, 3 .....

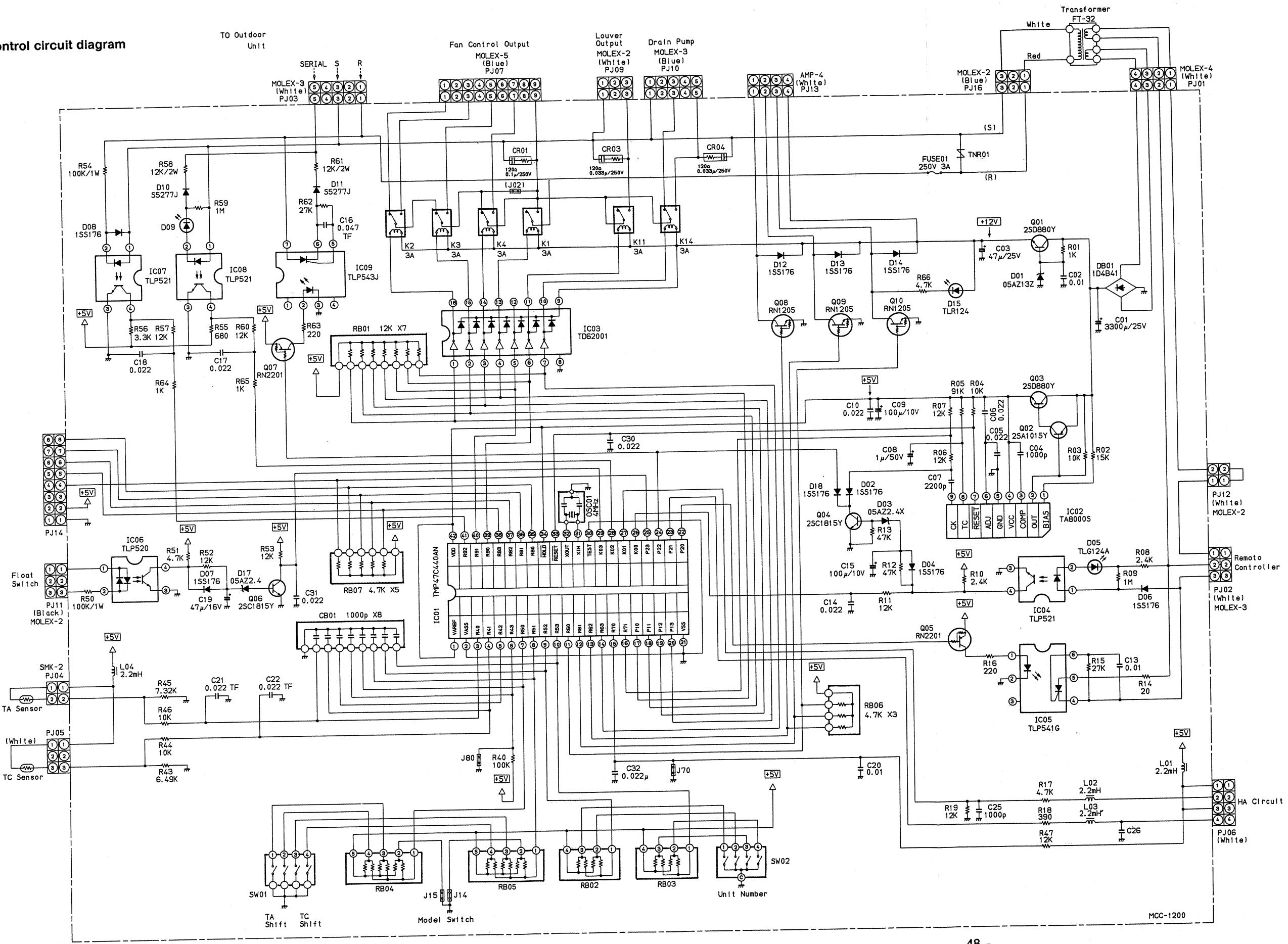


## 8.11 Indoor unit PC board



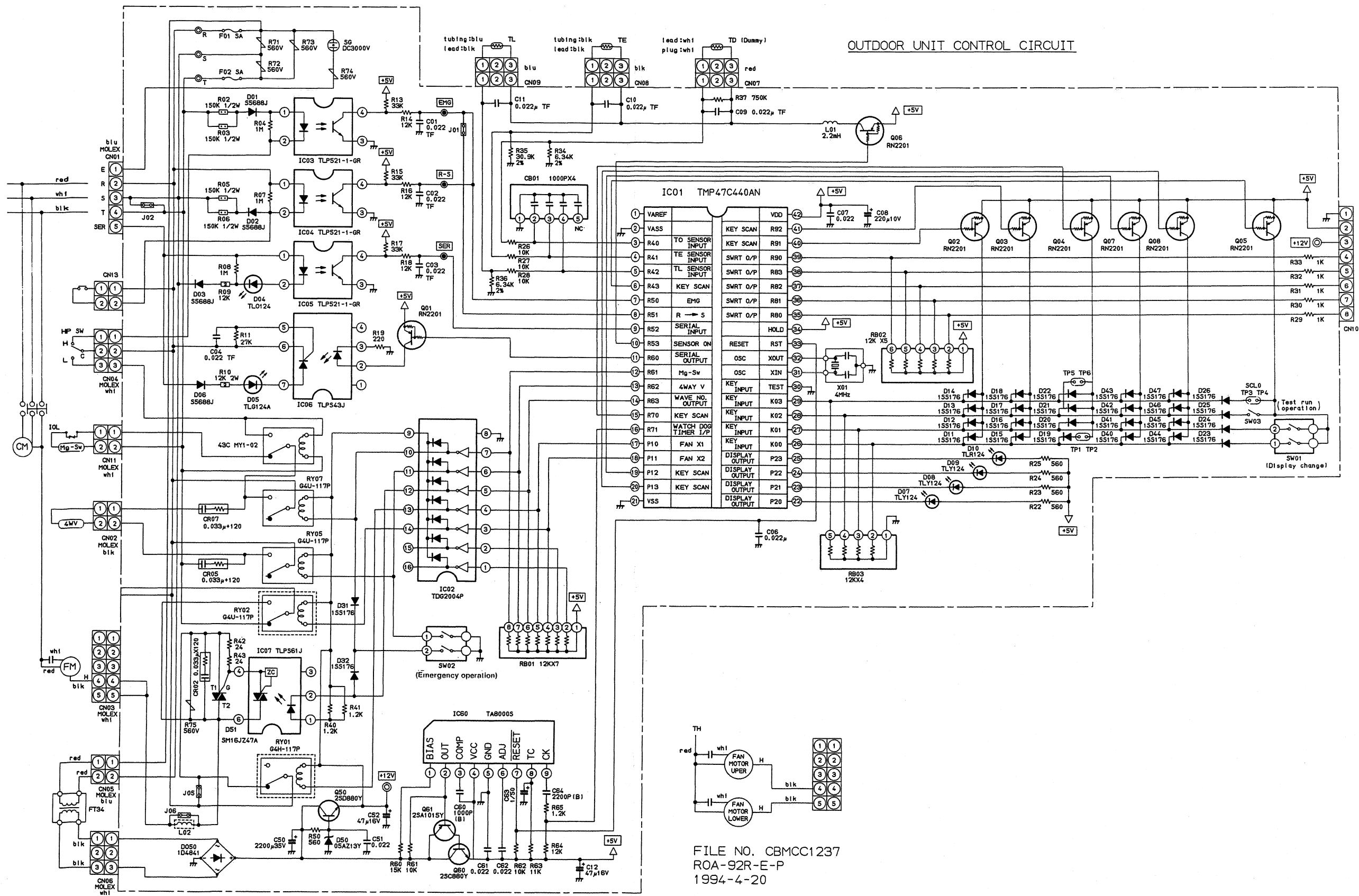
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### 8.12 Indoor unit control circuit diagram



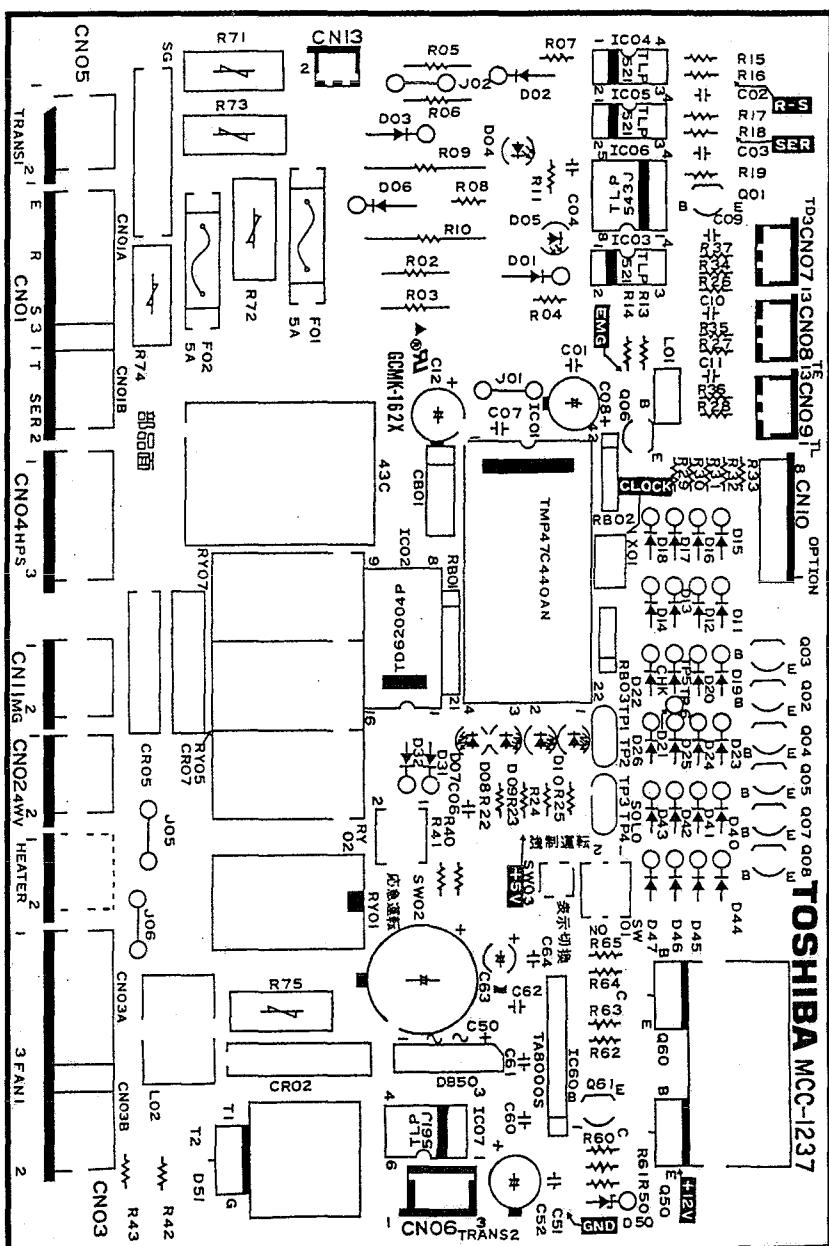
## 9. DESCRIPTION OF OUTDOOR UNIT CONTROL CIRCUIT

### 9.1 Outdoor unit control circuit diagram



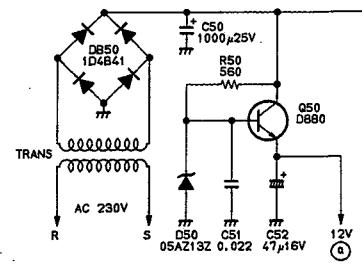
FILE NO. CBMCC1237  
ROA-92R-E-P  
1994-4-20

## 9.2 Outdoor unit PC board



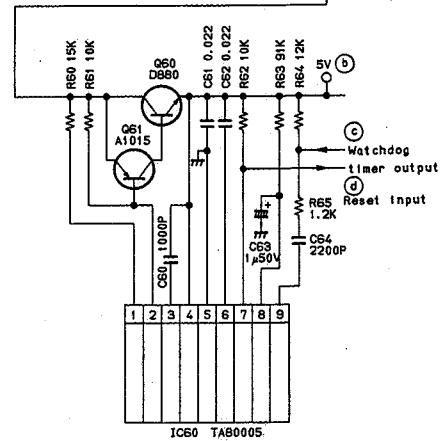
### 9.3 12V power source circuit

Outdoor PC board produces full-wave rectification by diode bridge (DB50) followed by the provision of transistor (Q50) produces DC power source (①) at 12V.



### 9.4 5V watchdog timer circuit

Basically, the same description as the indoor PC board applies, provided, however, that the reset circuit is not added to the outdoor side.



### 9.5 Sensor circuit

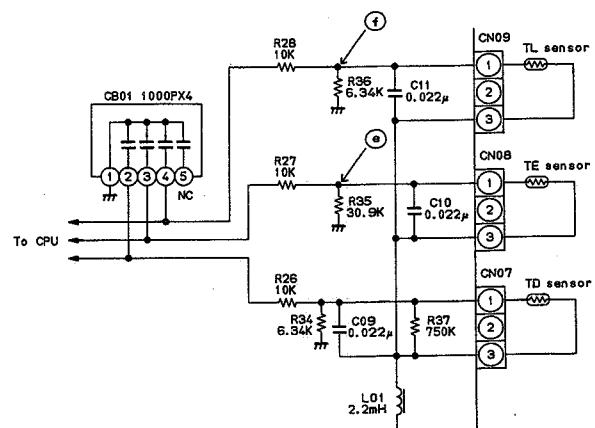
This circuit detects the temperature by dividing voltage with resistance and sensor and bringing the voltage value into CPU, using the characteristics of the sensor that resistance varies with different temperatures.

TE is for defrosting, while TL is for low ambient cooling operation.

The following voltages are produced at each of the temperatures.

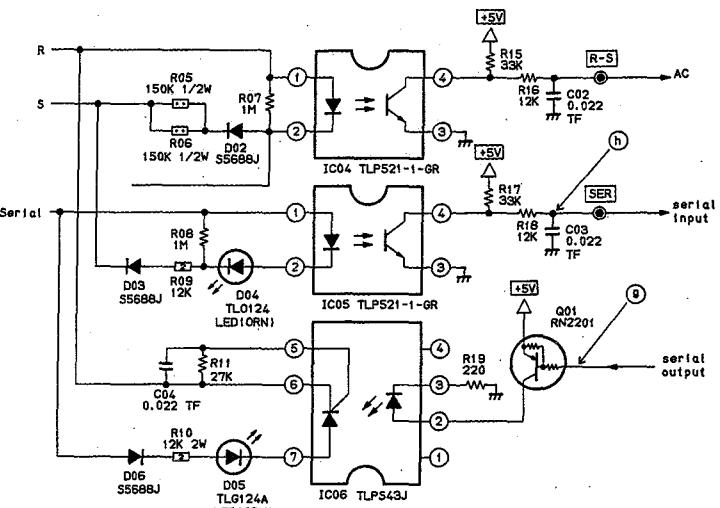
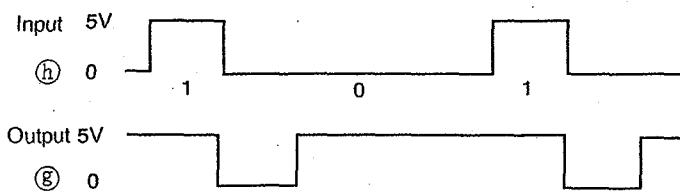
	0°C	25°C
TE ④	2.3V	3.8V
TL ⑤	2.3V	3.8V

When ④/⑤ are at GND or 5V, the sensors are either open or short-circuited.



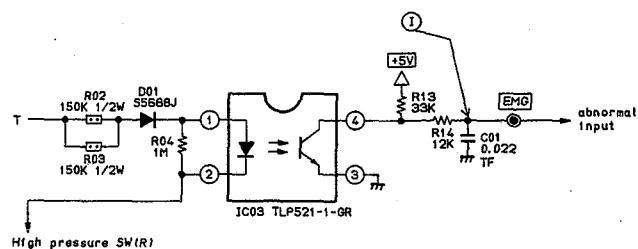
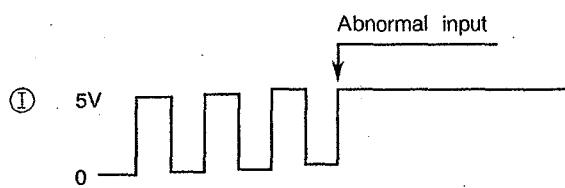
## 9.6 Serial signal circuit (between indoor and outdoor units)

Transmits and receives the signals between indoor and outdoor units in serial signals. As 230V is used for transmitting the signal, the microcomputer section is insulated with photo-coupler with 5V being supplied.



## 9.7 Abnormality-detecting circuit

When high pressure switch is operated, abnormality is detected to stop the compressor.



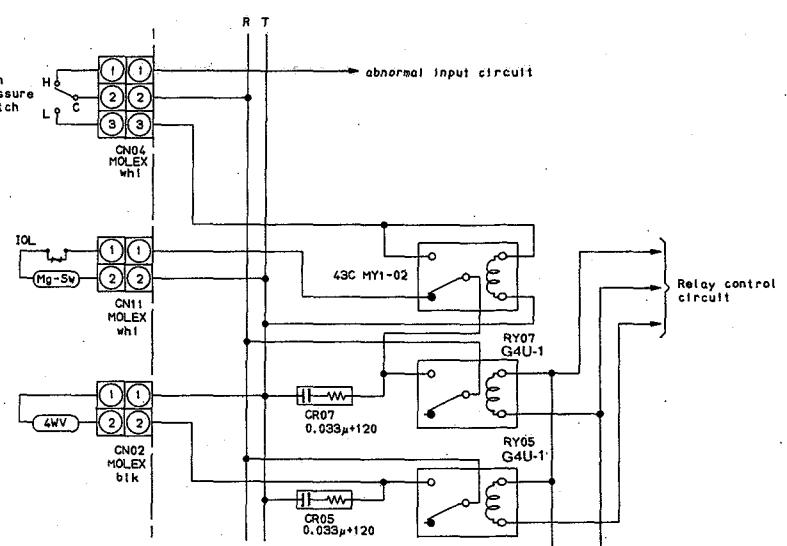
## 9.8 Relay circuit

The relay circuit consists of the diagram in the righthand side.

RY05 : 4-way valve ON/OFF

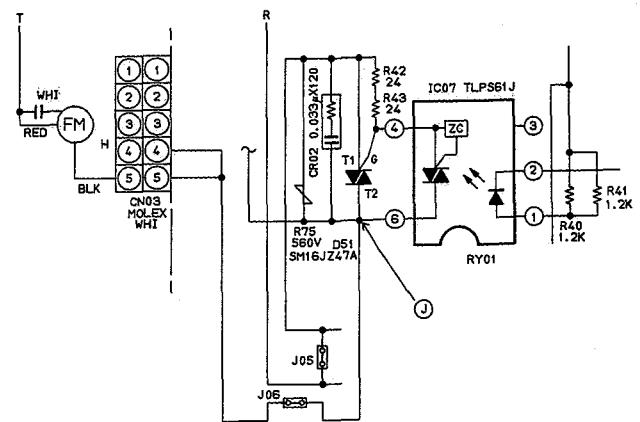
RY07 : Magnetic switch ON/OFF

43C : Self-holding relay used when high pressure switch operates. (Magnetic switch OFF)

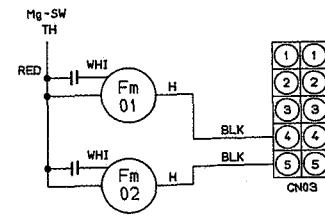
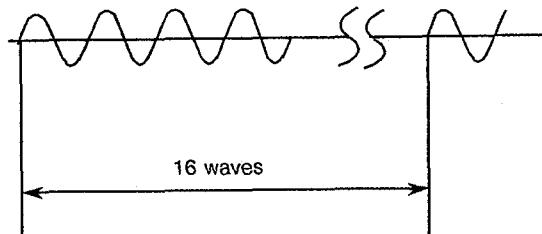


## 9.9 Fan speed control circuit

The fan speeds are controlled by triac IC07. This allows the fan to operate at any one of 16 speeds. This function only occurs when the unit is in the cooling mode, zero waves equates to fan stop.

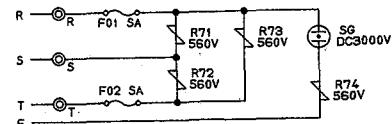


Waveform obtained between (J) and T.  
Example shown is for 4 waves.



## 9.10 Lightning surge protection circuit

The circuit on the right, protects the PCB from damage caused by a lightning surge. Varistors are connected between the live and neutral and live and earth lines to protect against voltage surges.



## 10. OPERATION OF AIR CONDITIONER FROM OUTDOOR UNIT

It is possible to operate the air conditioner from the outdoor unit using switches provided on the outdoor PCB.

① Set dip-switch (DSW01) bits 1 & 2 to ON position.

② STOP → OPERATION  
(orange LED off → orange LED flashing)

Hold push switch (SW03) down for a few seconds until LED D08 (yel) lights. Indoor unit will then start and a few seconds later, outdoor unit will start running.

After a few minutes, LEDs D07, D09 & D10 will light.

OPERATION → STOP  
(orange LED flashing → orange LED off)

Hold push switch (SW03) down for a few seconds. LED D10 will turn off and both units will stop running. LEDs D07, D08 & D09 will be turned off.

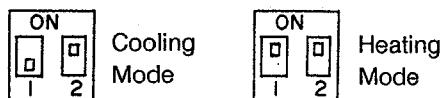
③ Reset DSW01 bits 1 & 2 to OFF position for normal operation.

## 11. EMERGENCY OPERATION

If the air conditioner develops a fault which stops it from operating normally, it is possible to operate the air conditioner using change-over connectors incorporated into the units. In this case, operation of the air conditioner is controlled by switching on and off the power supply. Details of how to change-over the units to operate in the emergency mode are shown below:

- ① Switch off the power supply to the outdoor unit.
- ② Remove the electrical parts cover from the indoor unit. Pull out the connector of R phase (red) lead wire from terminal ① and connect it with the connector of lead wire for fan motor K1 output (red).

**Note:** If the indoor unit is a cassette model, the float switch connector must be removed from the PCB. Replace the electrical parts cover on the indoor unit. On the outdoor unit PCB, change the switch settings on dip switch DSW02 as follows:

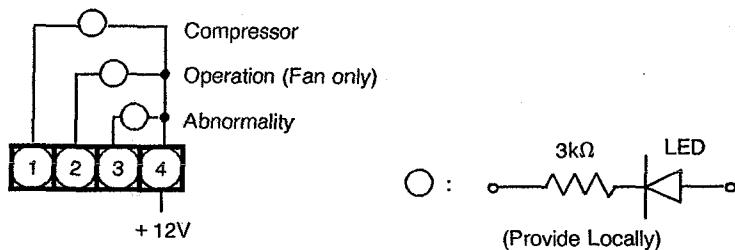


- ③ Switch on the power supply to the outdoor unit.

## 12. APPLIED CIRCUIT

### (1) Display output (PJ13)

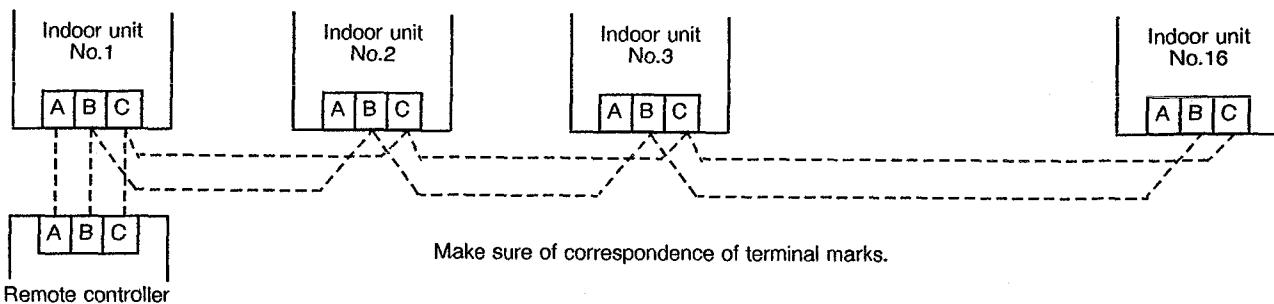
An auxiliary display output circuit (+12V) is available at PJ13 on the Indoor PC Board to display the operation for compressor, operation (Fan only) and abnormality.



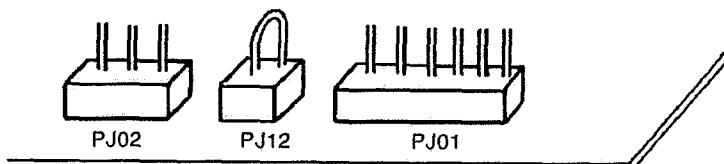
## 13. WIRING FOR GROUP OPERATION

Up to 16 units can be controlled as a group by one remote controller.

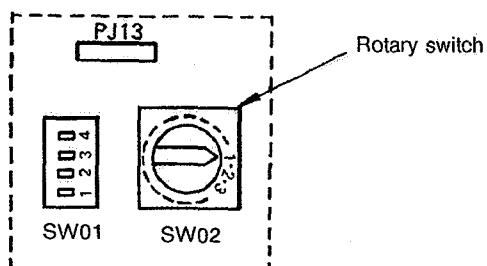
- ① Align the phase sequence of the power supply to all outdoor units.
- ② Connect the terminals A, B, C on both of the remote controller and the indoor unit of No.1 unit.
- ③ Connect terminals B, C on both indoor units of No.1 and No.2 unit. Then connect in the same way No.2 and No.3, No.3 and No.4 .... up to No.16 unit.



- ④ Remove the PJ12-connector on the indoor PC board of No.2 unit and up to No.16 unit to prevent malfunction.

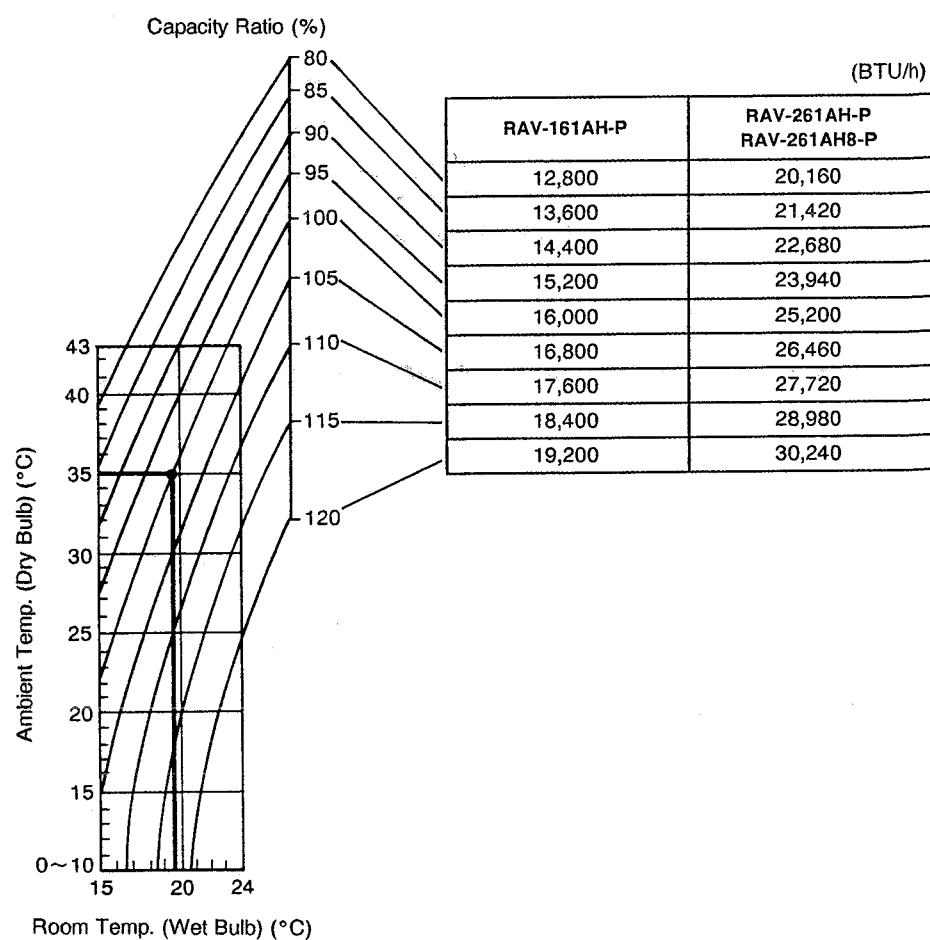


- ⑤ Set each unit No. rotary switch on the indoor PC board. The unit connected to the remote controller should be set as No.1 unit. Then set No.2 and up to No.16 so that start time of each unit is respectively delayed to prevent simultaneous starting current.

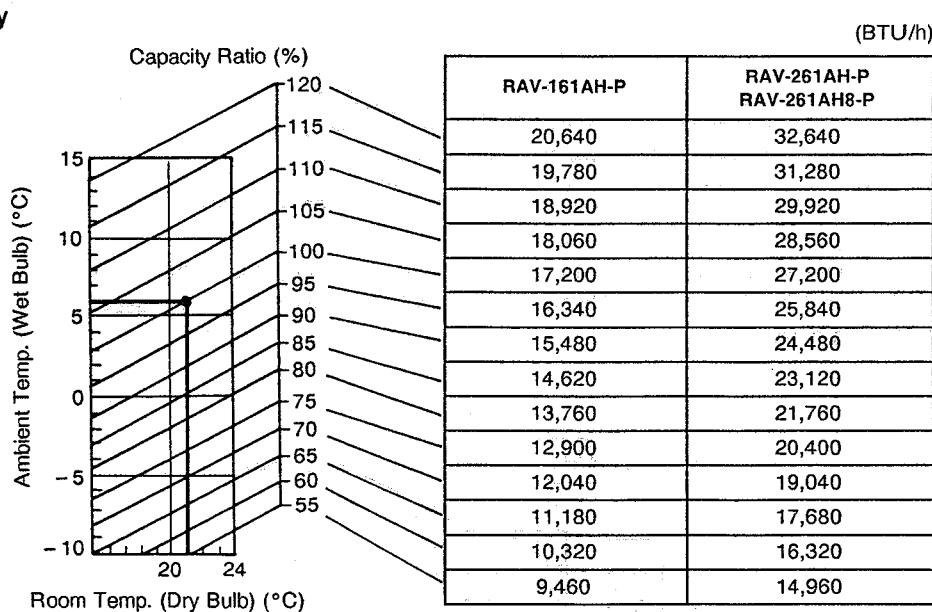


## 14. PERFORMANCE CHARACTER

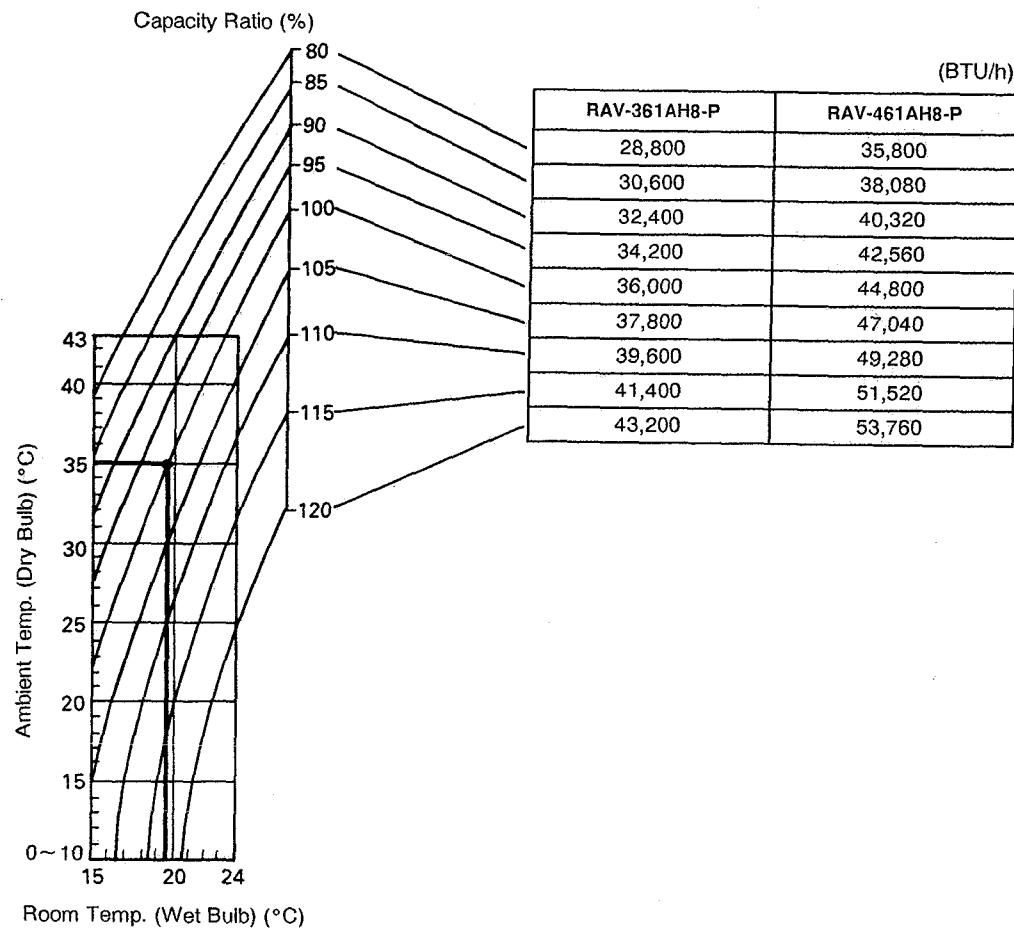
### Cooling capacity



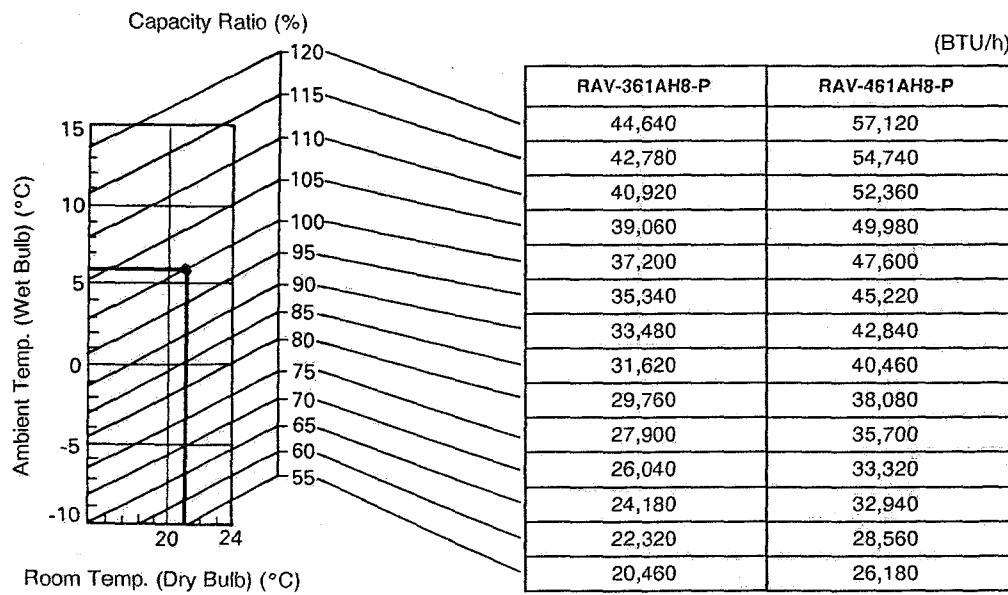
### Heating capacity



## Cooling capacity



## Heating capacity

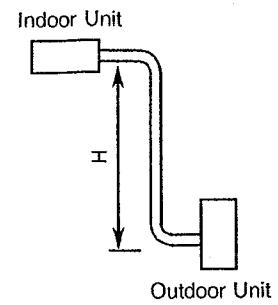
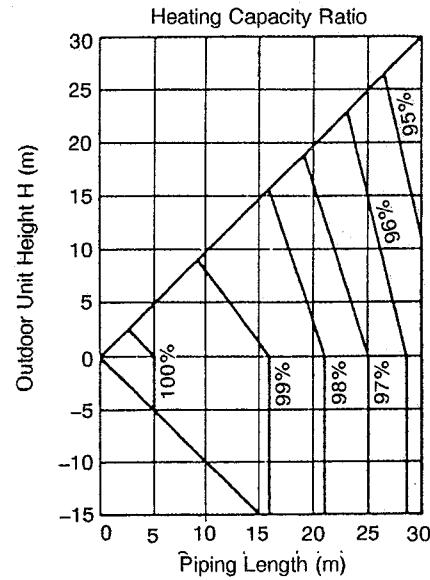
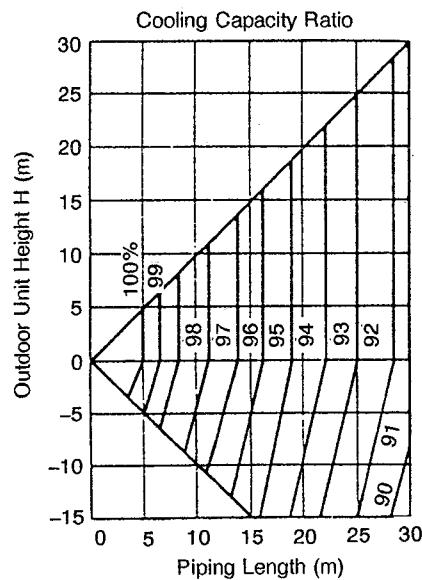


## Piping length/cooling capacity/heating capacity

RAV-161AH-P

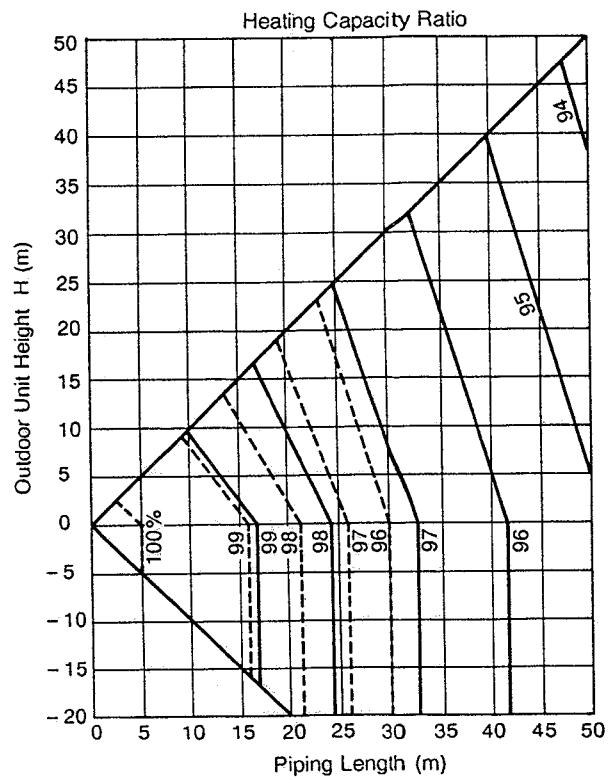
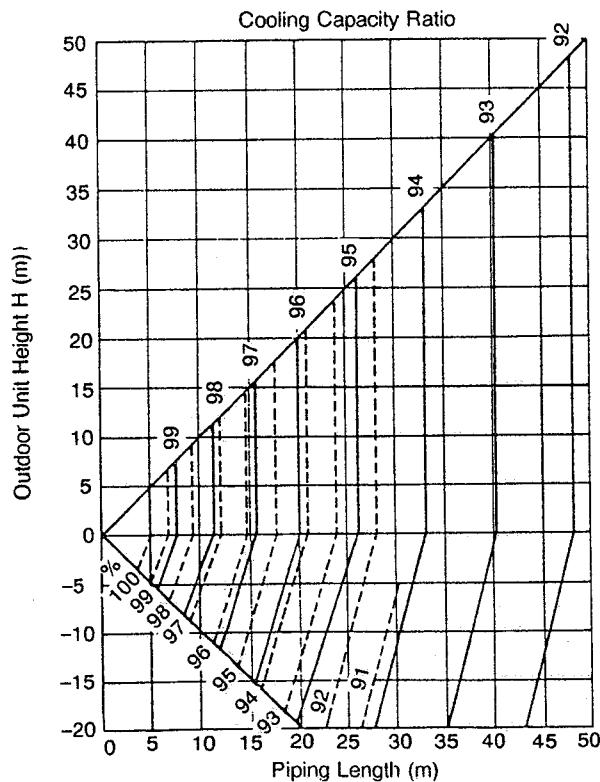
RAV-261AH-P

RAV-261AH8-P



RAV-361AH8-P

RAV-461AH8-P



The broken line shows in case the piping length is 30m or less.

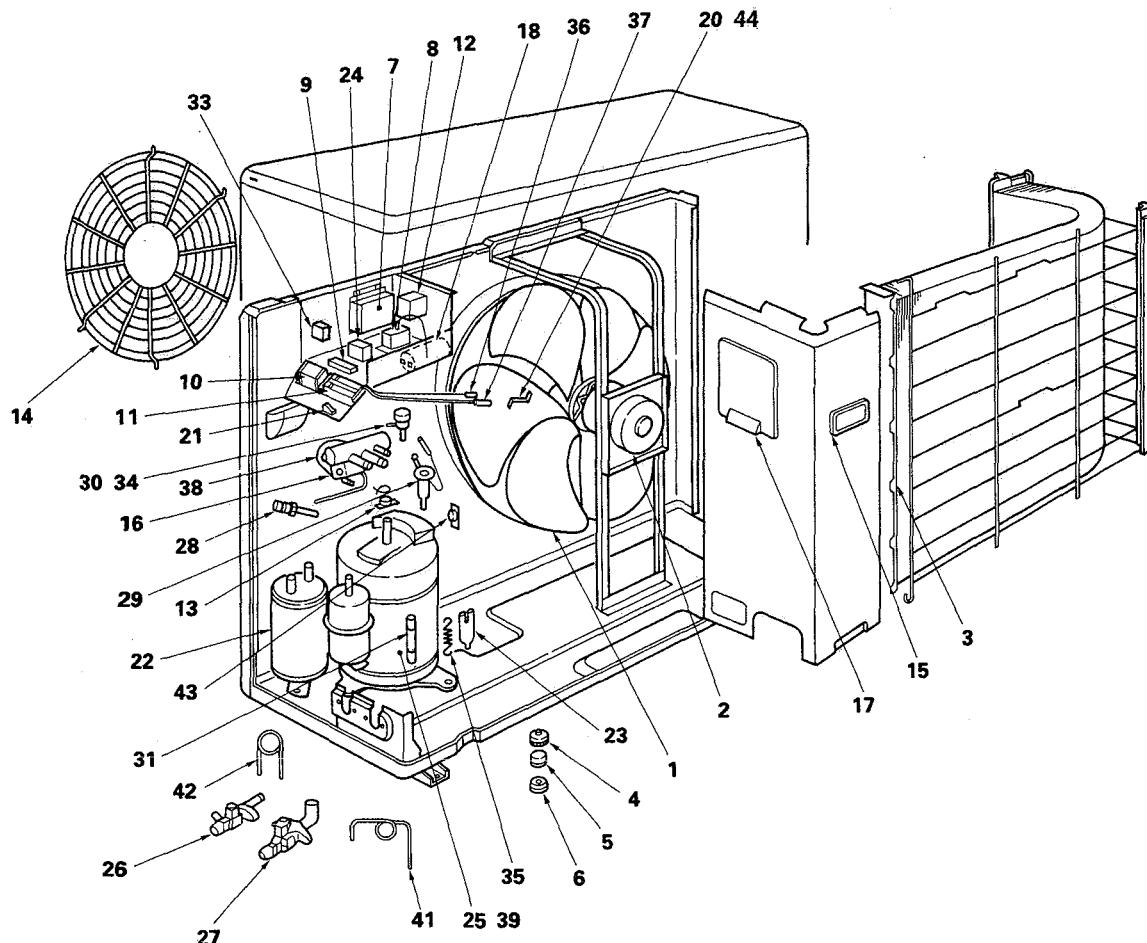
## Piping length/additional refrigerant volume

Model (RAV-)	Piping length less than (m)	20	Additional amount of refrigerant at installation site (kg)						Recharge amount of interchange time (kg)									
			25	30	35	40	45	50	5	10	15	20	25	30	35	40	45	50
161AH-P	Filled at factory	0.15	0.35						1.35	1.45	1.5	1.6	1.75	1.95				
261AH-P 261AH8-P		0.3	0.6						2.2	2.25	2.3	2.35	2.65	2.95				
361AH8-P		0.25	0.5	0.75	1.0	1.25	1.5	3.0	3.15	3.15	3.4	3.65	3.9	4.15	4.4	4.65	4.9	
461AH8-P		0.25	0.5	0.75	1.0	1.25	1.5	3.6	3.7	3.8	3.9	4.15	4.4	4.65	4.9	5.15	5.4	

- The amount of refrigerant put into the outdoor unit at the factory is equivalent to the one that fills up 20m length of refrigerant pipe.
- If the length of refrigerant pipe is 20m or less, addition of refrigerant at the installation site is unnecessary. If the length of the pipe exceeds 20m, add the refrigerant R-22.
- Overcharge or undercharge of refrigerant in the outdoor unit will cause malfunction of the compressor. The prescribed amount of the replenishment of the refrigerant is shown in the table above.  
The permissible amount of refrigerant is the prescribed amount  $\pm 50g$ .
- For RAV-361AH8-P and RAV-461AH8-P, the length of pipe exceeds 30m the size of pipe at the gas side must be raised one rank (eq 19.0 → 22.2).

## 15. EXPLODED VIEWS AND PARTS LISTS

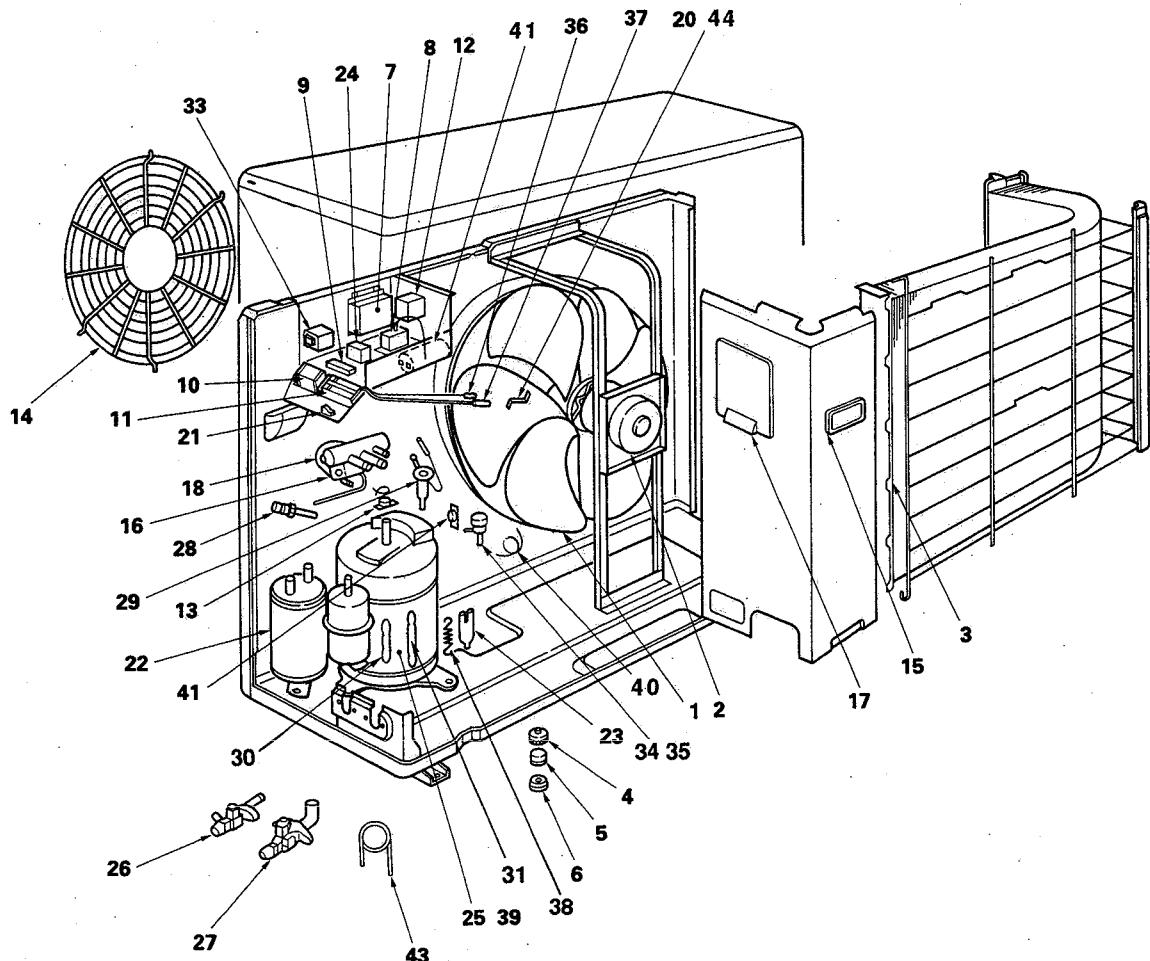
RAV-161AH-F



Location No.	Part No.	Description
1	43020156	Fan, Propeller
2	43A21003	Motor, Fan, AC 230V, 50Hz
3	43A43001	Condenser
4	43149212	Base, Spring, A
5	43049132	Spring, Buffer
6	43049132	Base, Spring, B
7	43A69001	PC Board
8	43146387	Switch, High-Pressure
9	43060479	Terminal Block, 4P
10	43160334	Terminal Block, 2P
11	43060324	Terminal Block, 3P
12	43152334	Magnetic Contactor
13	43054286	Relay, Overload
14	43191252	Guard, Fan
15	43119368	Hanger
16	43046255	Solenoid Coil
17	43162027	Cover, Electric Parts
18	43155115	Capacitor, Plastic Film, 45MFD, 440V
20	43107215	Holder, Sensor (TE)
21	43169600	Holder
22	43148105	Accumulator

Location No.	Part No.	Description
23	43145082	Dryer
24	43155080	Capacitor, Electrolytic
25	43041845	Compressor, AC 220/240V, 50Hz, PH250X3-4LS
26	43146454	Packed Valve
27	43146406	Packed Valve 1/2 Inch
28	43147321	Check Joint
29	43146424	Expansion Valve
30	43046198	Coil, 2-Way Valve
31	43146283	Checked Valve
33	43A58001	Transformer, Power
34	43046151	Valve, 2-Way
35	43193043	Spring
36	43A50001	Sensor, Cond. Out (TL)
37	43150196	Sensor, Heat Exch. (TE)
38	43146368	Valve, 4-Way
39	43157167	Heater, Crankcase
41	43146459	Capillary Tube
42	44246235	Capillary Tube
43	43150122	Thermostat, Bimetal
44	43107215	Holder, Sensor (TL)

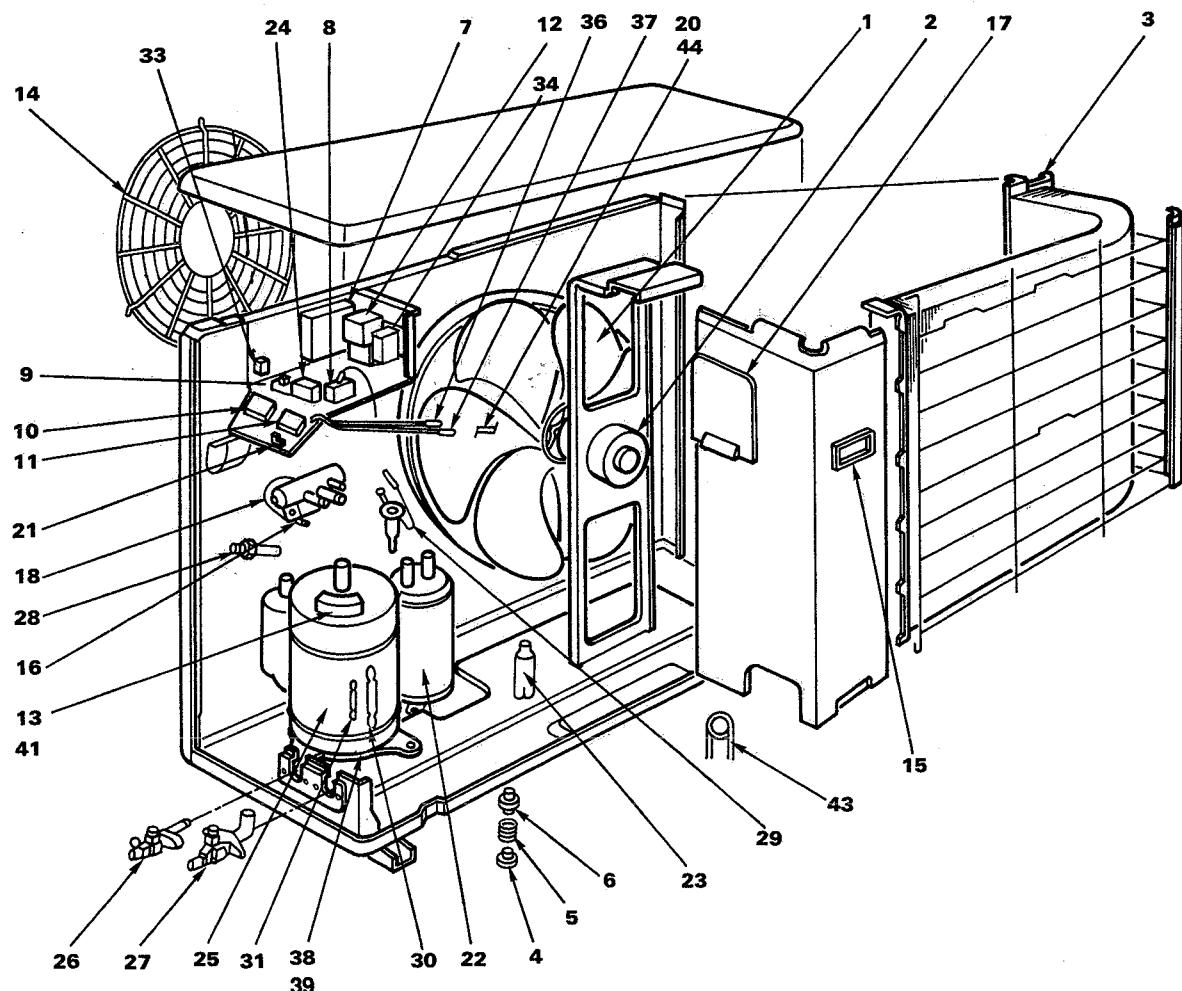
RAV-261AH-P



Location No.	Part No.	Description
1	43120156	Fan, Propeller
2	43A21002	Motor, Fan, AC 230V, 50Hz
3	43A43002	Condenser
4	43049132	Base, Spring, B
5	43149198	Spring, Buffer
6	43149212	Base, Spring, A
7	43A69001	PC Board
8	43146387	Switch, High-Pressure
9	43060479	Terminal Block, 4P
10	43160334	Terminal Block, 2P
11	43060324	Terminal Block, 3P
12	43152334	Magnetic Contactor
13	43150122	Thermostat, Bimetal
14	43191252	Guard, Fan
15	43119368	Hanger
16	43046255	Solenoid Coil
17	43162027	Cover, Electric Parts
18	43146368	Valve, 4-Way
20	43107215	Holder, Sensor (TE)
21	43169600	Holder
22	43148114	Accumulator

Location No.	Part No.	Description
23	43145082	Dryer
24	43155080	Capacitor, Plastic Film
25	43140318	Compressor, PH330X3-4MS
26	43146451	Packed Valve (3/8")
27	43146417	Packed Valve (5/8")
28	43147321	Check Joint
29	43146433	Expansion Valve
30	43046156	Checked Valve
31	43146283	Checked Valve
33	43A58001	Transformer, Power
34	43046151	Valve, 2-Way
35	43046198	Coil, 2-Way Valve
36	43A50001	Sensor, Cond. Out (TL)
37	43150196	Sensor, Heat Exch. (TE)
38	43193043	Spring
39	43157167	Heater, Crankcase
40	44246236	Capillary Tube
41	43055379	Capacitor, Electrolytic
43	43146459	Capillary Tube
44	43107215	Holder, Sensor (TL)

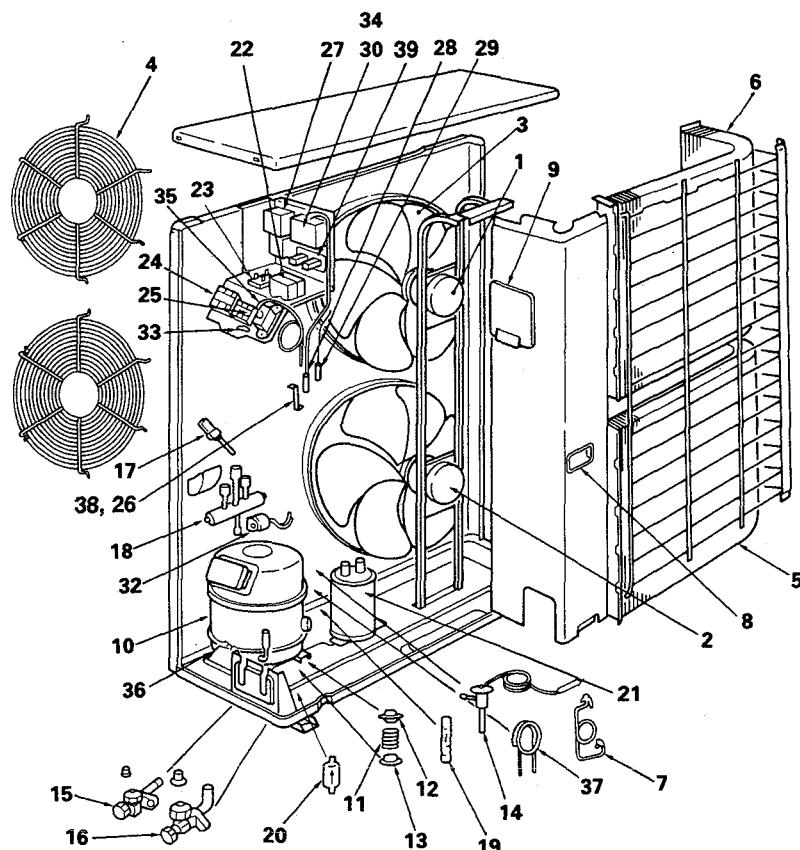
RAV-261AH8-P



Location No.	Part No.	Description
1	43120156	Fan, Propeller
2	43A21002	Motor, Fan, AC 230V, 50Hz
3	43A43002	Condenser
4	43049132	Base, Spring, B
5	43149198	Spring, Buffer
6	43149212	Base, Spring, A
7	43A69001	PC Board
8	43146387	Switch, High-Pressure
9	43060157	Terminal Block, 4P
10	43160264	Terminal Block
11	43060324	Terminal Block, 3P
12	43152345	Magnetic Contactor
13	43050277	Thermostat, Bimetal
14	43191252	Guard, Fan
15	43119368	Hanger
16	43046255	Solenoid Coil
17	43162027	Cover, Electric Parts
18	43146368	Valve, 4-Way
19	43107215	Holder, Sensor (For TE)
20	43169600	Holder

Location No.	Part No.	Description
22	43148114	Accumulator
23	43145082	Dryer
24	43155080	Capacitor, Plastic Film
25	43141302	Compressor, AC 380/415V, 50Hz, YH330X3-MS
26	43146451	Packed Valve (3/8")
27	43146417	Packed Valve, 5/8 IN
28	43147321	Check Joint
29	43146433	Expansion Valve
30	43046156	Checked Valve
31	43146283	Checked Valve
32	43A58001	Transformer, Power
33	43154148	Return Lock STR-4AB
34	43A50001	Sensor, Cond. Out (TL)
35	43150196	Sensor, Heat Exch. (TE)
36	43193043	Spring
37	43157167	Heater, Crankcase
38	43063195	Holder Thermostat, Bimetal
39	43146459	Capillary Tube
40	43107215	Holder, Sensor (for TL)

RAV-361AH8-P  
RAV-461AH8-P



Location No.	Part No.	Description
1	43A21002	Motor, AC 230V, 50Hz, Fan
2	43A21003	Motor, AC 230V, 50Hz, Fan
3	43120156	Fan, Propeller
4	43191252	Guard, Fan
5	43143638	Condenser, Lower (RAV-361AH8-P)
5	43143636	Condenser, Lower (RAV-461AH8-P)
6	43143639	Condenser, Upper (RAV-361AH8-P)
6	43143637	Condenser, Upper (RAV-461AH8-P)
7	43047492	Capillary Tube (RAV-361AH8-P)
7	43047527	Capillary Tube (RAV-461AH8-P)
8	43119368	Hanger
9	43162027	Cover, Electric Parts
10	43140404	Compressor, YH406JA
10	43140506	Compressor, YH506JA
11	43149198	Spring, Buffer
12	43149212	Base, Spring, A
13	43049132	Base, Spring, B
14	43146362	Expansion Valve (RAV-361AH8-P)
14	43146438	Expansion Valve (RAV-461AH8-P)
15	43146451	Packed Valve (3/8")
16	43146416	Packed Valve (3/4")
17	43147321	Check Joint
18	43146468	Valve, 4-Way (RAV-361AH8-P)
18	43146467	Valve, 4-Way (RAV-461AH8-P)

Location No.	Part No.	Description
19	43146283	Checked Valve
20	43145092	Dryer
21	43148096	Accumulator (RAV-361AH8-P)
21	43148114	Accumulator (RAV-461AH8-P)
22	43155080	Capacitor, Plastic Film
23	43060479	Terminal Block, 4P
24	43160264	Terminal Block, 2P
25	43060324	Terminal Block, 3P
26	43107215	Holder, Sensor (TL)
27	43152342	Magnetic Contactor (RAV-361AH8-P)
27	43152343	Magnetic Contactor (RAV-461AH8-P)
28	43150196	Sensor, Heat Exch. (TE)
29	43A50001	Sensor, Cond. Out (TL)
30	43A69001	PC Board
32	43046255	Solenoid Coil
33	43169600	Holder
34	43163016	Support
35	43146387	Switch, High-Pressure
36	43157140	Heater, Crankcase
37	43146430	Capillary Tube (RAV-361AH8-P)
37	43146431	Capillary Tube (RAV-461AH8-P)
38	43107215	Holder, Sensor (TE)
39	43A58001	Transformer, Power